

UNDERSTANDING THE RESPONSE OF COMMERCIAL AND INSTITUTIONAL ORGANIZATIONS TO THE CALIFORNIA ENERGY CRISIS

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Table of Contents

Executive Summary	v
Key Findings	vi
A New Model of Organizational Conservation Action	viii
Policy Responses	x
1 Introduction	1
1.1 The Energy Crisis	1
1.2 The Policy Response	2
1.3 Research and Evaluation Activities	3
2 Research Design	4
2.1 Research Approach	4
2.1.1 Complex Nature of Decision-Making	4
2.1.2 Complex Nature of Energy Consumption	5
2.2 Research Questions	6
2.3 Research Methods	6
2.3.1 Semi-Structured Interviews	6
2.3.2 Sampling	7
2.3.3 Selection Bias	10
3 Findings	11
3.1 Office Sector	11
3.1.1 Energy Concern of Office Organizations	12
3.1.2 Energy-Related Conditions of Office Organizations	16
3.1.3 Energy Capacity of Office Organizations	17
3.2 Retail Sector	20
3.2.1 Energy Concern of Retail Organizations	21
3.2.2 Energy-Related Conditions of Retail Organizations	22
3.2.3 Energy Capacity of Retail Organizations	23
3.3 Effects and Persistence	24
4 Program and Policy Implications	25
4.1 Program Observations	26
4.1.1 Public Sector Loan and Grants Program	26
4.1.2 Cool Roofs Program	28

4.1.3	<u>Innovative Peak Load Program</u>	31
4.2	<u>Policy Implications</u>	33
4.2.1	<u>Models of Organizational Conservation Action</u>	34
4.2.2	<u>Policy Responses</u>	36
5	<u>Conclusion</u>	42
6	<u>References</u>	43
	<u>Appendix A: Interview Protocol</u>	45
	<u>Appendix B: CEC Program Descriptions</u>	46
B.1	<u>Public Agency Loan and Grants Program</u>	46
B.1.1	<u>Management</u>	47
B.1.2	<u>Delivery Agents</u>	47
B.1.3	<u>Completed Interviews</u>	47
B.2	<u>Cool Roofs</u>	48
B.2.1	<u>Management</u>	48
B.2.2	<u>Delivery Agents</u>	48
B.2.3	<u>Completed Interviews</u>	49
B.3	<u>Innovative Peak Load</u>	49
B.3.1	<u>Management</u>	49
B.3.2	<u>Delivery Agents</u>	50
B.3.3	<u>Completed Interviews</u>	50
B.4	<u>Non-participants</u>	51

Executive Summary

Beginning in the summer of 2000, California experienced serious energy supply problems, sharp increases in wholesale (and retail) electricity and natural gas prices, and isolated blackouts. In response to the rapidly worsening electricity situation in California in late 2000, the state set, as an initial goal, the reduction of the state's peak demand for the summer of 2001 by 5,000 megawatts. To meet this goal, the governor and legislature took a variety of steps to enhance supply, encourage rapid voluntary reductions in demand, and provide incentives for actions that would result in load reductions. Three bills—Assembly Bill 970, Senate Bill X1 5 and Assembly Bill X1 29—allocated roughly \$950 million for consumption and demand reduction programs. The governor also enacted a variety of additional measures, including the “Flex Your Power” (media awareness and direct business involvement) campaign, requirements for retail sector outdoor lighting reductions, and toughening of energy efficiency building codes.

There were, in fact, significant reductions in electricity demand in California during the summer of 2001 and the large number of expected supply disruptions was avoided. To understand the nature of these demand reductions and the motivations for consumer response, Washington State University (WSU) undertook a study for the California Energy Commission (CEC) focusing on conservation behavior in the residential, commercial, and agricultural sectors. The research presented in this report represents an exploration of the response of commercial and institutional organizations to the California energy situation and the unique set of influences that existed during this time. These influences included informational messages and media attention, program interventions, price changes, and external triggering events (e.g. blackouts). To better understand the effects of these influences on organizational response to the energy situation, we conducted 84 semi-structured interviews with members of commercial and institutional organizations (many of which participated in three different California Energy Commission Programs) and with 21 key informants representing program managers, administrators, and aggregators as well as a small number of energy service providers and utilities. Separate reports examine the consumer response in the residential and agricultural sectors.

The conventional wisdom might describe the success of efforts to avoid blackouts during the summer of 2001 as follows:

- Californians swung into action and saved a good deal of energy
- A combination of programs were influential and effective in inducing these responses
- Business/institutional choices would be expected to be largely economic, rational and optimizing
- However, some organizations (e.g., smaller, hard-to-reach businesses) may have been particularly handicapped by poor information and a variety of other barriers to conservation¹ actions

Our research into commercial and public organizational behavior elaborates on this conventional wisdom. While there were certainly savings in the commercial sector (as measured at the

¹ In this report we use the terms conservation and energy conservation to refer to a range of actions to reduce energy use, including curtailment and energy efficiency.

systems level), we found that conservation action by firms and public sector organizations was not universal, and that the nature of actions taken and their potential effectiveness varied, even across organizations that appeared to be relatively similar in important ways. The following key findings from our research add to our understanding of the summer of 2001 and help explain the motivations and responses of organizations to the energy situation.

Key Findings

The meaning and effects of stimuli such as prices, blackouts, media, and economic conditions were quite variable across organizations.

- Rising energy prices impacted organizations in different ways. For public sector organizations, the impact of higher energy prices on budgets was a significant concern because these organizations have fixed income and strict budgetary requirements. Private firms were more concerned about maintaining their profitability. Higher energy costs can be more significant for smaller firms that are less able to absorb these costs. Some firms can pass on higher energy costs to their customers (for example real estate firms typically pass these costs to their tenants).
- There were organizations that were affected very little by higher energy prices. These included: small organizations with little energy consumption, organizations served by municipal utilities, and organizations with fixed price contracts with third party suppliers.
- Public opinion influenced some organizations to take visible conservation actions such as reducing lighting levels to demonstrate that they were doing their part. This was most true of government and retail organizations that are highly visible to the public.
- Even though blackouts were not a problem during summer 2001, many organizations were concerned about the impacts of threatened blackouts. For local governments, blackouts presented significant health and safety concerns in their jurisdictions. Private firms were concerned about loss of business and security issues.
- The energy crisis was a very visible issue during summer 2001, but the events of September 11th and the economic downturn have pushed energy out of the limelight. The uncertainty created by these events can stall further energy efficiency actions.

Organizations vary considerably in their sophistication and ability to identify and implement effective conservation and/or efficiency strategies. Organizational responses to the energy crisis depended upon their particular circumstances and their ability to act within the limited time frame of the crisis.

- Some organizations (such as local governments) responded quickly to the energy crisis to address budget concerns and public expectations. This often led to operational type actions such as changes to thermostat settings and operating schedules, turning off lights and equipment, and other conservation activities that could be implemented quickly. However, many private sector firms such as commercial real estate organizations were limited in their ability to take these kinds of actions due to contractual constraints and/or operational requirements.
- When making decisions about actions involving efficiency improvements to their buildings, organizations considered things they were already planning to do, recognized

problems that needed to be addressed (repairs/replacement of failing equipment), and what was judged to be possible. In some cases, the energy situation accelerated planned or needed actions. But some firms had been implementing efficiency improvements in their facilities for many years, which limited their opportunities for further action during the energy crisis.

- The presence of technology such as an energy management system made it easier for some organizations to take action to control or limit their energy use. Planning for action was also easier for those organizations with building stocks of similar buildings (e.g., chains or big box retail), while organizations with large and diverse building stocks required a higher level of effort to produce comparable levels of saving.
- The energy crisis got the attention of key decision-makers in many public and private organizations. In terms of an organization's capacity for taking energy efficiency actions, attention from the top levels of the organization is often an important determinate of how seriously the actions are pursued. In some cases, energy decisions were made at the local level, while in other cases decisions were made by central management at another location or even another state. Where decisions are made can impact the ability to take action in both positive and negative ways.
- Organizations drew upon their past experience and institutional knowledge base to identify how their organization should respond to the 2001 energy situation. Many of the local governments and office building real estate firms we spoke with had some past experience with energy efficiency or conservation efforts. This experience and knowledge, along with the existence of resources such as energy management teams (or at least designated responsibility for energy management) or energy plans, allowed some organizations to respond more quickly to the energy crisis.
- The organizational networks in which firms and public organizations are involved (e.g., utilities, energy service companies [ESCOs], CEC subcontractors, trade associations, installers) played a role in the decisions that organizations made, helping increase their capacity to act. Both public and private organizations tended to use peers/trade allies (including watching competitors) and peer organizations as sources of information and models for action.

Generally our respondents had a favorable view of the results of their actions. Many believed they had reduced their electricity demand and that this contributed to the lack of blackouts. Organizational staff responded positively and customers had few complaints. They felt that their actions helped to mitigate the negative effects of the energy crisis on their organization. Yet, many acknowledged that they did not yet have the data to show they had actually saved energy. In some cases, organizations were still implementing or had just completed efficiency projects and the full savings impacts from these projects will not be evident for some time. Although it is clear that time is needed for organizations to fully judge the effects of their actions and whether this experience supports continuation of their efforts, our respondents generally felt their conservation and efficiency actions would continue. New organizational policies and procedures, and newly identified efficiency opportunities, which are now reinforced by higher (and still uncertain) prices, seem likely to produce additional voluntary energy savings in the future. To the degree that organizational structures were changed to accommodate new input on energy management and consumption, results may be more lasting.

We drew our research sample primarily from three CEC programs: Public Sector Loan and Grants, Cool Roofs, and Innovative Peak Loads. Our intent was not to evaluate these programs per se, but to use them as access points to organizations. However, in the course of our interviews with program participants, managers, administrators, and aggregators, we also gained some valuable insights about these programs. For example:

- Program familiarity is important. The public sector loan program has operated for almost 20 years. Public organizations are familiar with this program. The additional funding allocated for this program was quickly utilized. New programs such as the Cool Roofs program are less familiar—a condition that limits awareness, trust and participation.
- Programs provide financial resources that may “tip the balance,” allowing organizations to take action and stretch their limited resources. The urgent nature of the energy crisis caused organizations to choose actions that they could implement quickly. In the case of capital improvements that reduced energy use, this often involved projects that were already being planned. The crisis and any available financial incentives may have caused organizations to take action more quickly than originally planned.
- The programs tended to favor larger organizations. These organizations have the resources to respond to the programs quickly and take advantage of the funding before it runs out. Also, many programs have a lower limit on project size that excludes a large number of small organizations.
- Organizations that participated in the Cool Roofs program were already planning to repair or replace their roofs. Roofing is not seen as an energy issue. Organizations do not replace their roofs to save energy—they replace (or repair) them to provide structural protection. Program incentives are not sufficient to cause an organization to install a cool roof product unless they are already planning to replace or extend the life of their existing roof. In a replacement or repair situation, the roofer is an important ally and needs to be actively engaged in the process. Many participants told us that it was the roofing contractor who informed them about the program. Likewise, if new roofing products (such as cool roofs) are going to become more common, they must demonstrate improved roofing performance relative to more traditional roofing products.
- While the CEC program participants we spoke with were generally positive about their experiences with the programs, they offered a variety of suggested changes that they believed would make it easier for them to participate in the programs. These included: streamlining the application process, clarifying program requirements (and making it easier to qualify), offering technical assistance to complete program applications, and increasing the speed of inspections, review of applications, and disbursement of grants and loans. More consistent program funding and consistent programs in the long-term make it easier for organizations to make plans and take advantage of the opportunity to participate in these programs.

A New Model of Organizational Conservation Action

Our research findings provide a basis for a proposed new model of organizational conservation action. This model expands on conventional views of conservation action and helps to explain what we observed in our research.

Some conventional models of conservation action in organizations might include the following three cases.

- A **simple view** of organizational action would suggest that the energy crisis (price increases, blackouts) led, rather unproblematically, to self-interested conservation action.

crisis → conservation action

- A more sophisticated view of economic decision-making suggests that the market for energy conservation practices is not wholly efficient. In this **market barriers view**, classic demand-side management programs are put in place to overcome market barriers to the adoption of more energy-efficient technologies and practices.

crisis → market barrier → DSM program → conservation action

- During this period there was an unprecedented energy program and energy policy response including a prominent promotional and advertising campaign (Flex Your Power). This **program/media view** suggests that the media campaign made people aware of actions they could take and encouraged them to take those actions out of a sense of duty, patriotism, pride, etc.

crisis → media campaign → conservation action

These views tend to overlook the internal dynamics of organizations themselves and treat organizations as a homogeneous group. This does not help to explain why organizations did (and didn't) take action and how future efforts to encourage energy efficiency and demand reduction might best be tailored and targeted. An **elaborated view** holds that, whatever the source, *concern* is a necessary pre-condition for action (and concern was not universal last summer). Also, regardless of the level of concern, the *capacity* of organizations to act also varies and is a crucial pre-condition for conservation action. Also, these may or may not be stimulated directly by either programs or media-based appeals.

crisis → programs/media →

concern + capacity → conservation action

Finally, a more **complete view** also recognizes that, despite concern and capacity, the *real-world conditions* facing the organization (the nature of its buildings, its production processes and machinery, its capitalization structure, supplier dependencies, and a host of other real-world conditions and constraints) are also crucial determinates of conservation choice. "Conditions" might also be subdivided into "technical" and "network" components, but both sorts are responsible for defining real-world *opportunities* for action by the firm/organization.

crisis → programs/media →

concern + capacity + conditions → conservation action

These are the beginnings of a model that locates the firm and its technology in a larger context. It offers a framework for a possible (future) *structural/causal account* of how and when conservation action is taken and might be expected (e.g., among various populations of organizations, such as retail firms, agri-business, hotels, prisons, high-rise office buildings, etc.). It should be noted that this model is an alternative to the **market barriers view**. It recognizes the

internal dynamics of organizations and the conditions they face. It suggests that programs should focus on organizational concern, conditions, and capacity rather than market barriers.

Policy Responses

A matrix of possible combinations of concern, capacity and conditioning factors can offer a heuristic for use in exploring *how to best tailor and target policy interventions* to the circumstances of particular subgroups of organizations (Table ES.1). This matrix can help us consider what actions might help to maintain or raise concern, develop capacity, and affect the conditions of organizations to encourage and facilitate conservation action.

Table ES.1. A Heuristic for Tailoring Policy and Program Interventions

Concern Concern about energy	Conditions Opportunities for conservation	Capacity Ability to act on opportunities	Policy approach to increasing energy efficiency (EE)	Speculation about whether price increases might encourage (+) or discourage (-) conservation action
Yes	Yes	Yes	Recognize/Encourage EE	+
Yes	No	Yes	Recognize past EE, create future opportunities	+
Yes	Yes	No	Technical assistance, incentives, peer support, education	+
Yes	No	No	Technical assistance, peer support, education, create future opportunities	+/-
No	Yes	Yes	Incentives, non-energy benefits, recognize past EE	+/-
No	No	Yes	Support continuous improvement, identify non-energy benefits, recognize past EE	-
No	Yes	No	Technology assistance, incentives, peer support	-
No	No	No	Mandatory efficiency standards	-

For desired energy behavior to persist in the longer-term, there must be long-term change in concern, conditions, or capacity. The policy question then becomes how to support long-term changes in concern, conditions, and/or capacity and where and when it's appropriate to address one or another or a combination of these. Given the ebb and flow of concern about energy, and its relative status vis a vis other socio-economic-political priorities, an important challenge facing the CEC and other energy program/policy bodies in California involves moving now from a short-term crisis approach to a long-term policy approach.

Based on our research and emerging model of organizational conservation action, a post-crisis approach to programs and policy would do the following:

- Develop relationships with organizations and aim to better understand organizations. Use of existing peer networks and service delivery systems is an important mechanism for accomplishing this.
- Create more certainty in the marketplace. Programs and policies need to exist for minimal periods of time before they are incorporated into organizational processes. Program stability provides opportunities for organizations to reduce uncertainty in energy choices and program participation.
- Reward, encourage, and support good long-term energy management practices in organizations. Support efforts that result in changes in organizational structure that lead to improved energy management practices. Demonstrate ways in which good energy practices can provide many benefits that respond to organization concerns and needs.
- Support organizational efforts to be better (more responsive) consumers of energy through targeted outreach, recognition, networking, and education efforts.

We have presented a preliminary model of organizational action that begins to explain how, why, and when organizations make choices about energy consumption options. We believe that further development and refinement of this understanding of intra- and inter-organizational dynamics can contribute to more effective energy policy formulation and implementation. The research reported here was conducted under a crisis time frame and was not intended to be comprehensive or definitive. Also, it was one of a number of studies and evaluations undertaken by government agencies, consulting firms, and non-government organizations—all under crisis conditions, and with various strengths and weaknesses. As a result, a variety of research questions about organizational conservation response remain to be addressed. One is whether there is evidence of long-term change in the energy behavior of organizations resulting from the actions taken last summer to reduce energy consumption and how this relates to actual reductions in energy use. Another is how the variety of research and evaluation work on organizations and their actions in 2001 have produced both complementary and contradictory findings.

1 Introduction

Beginning in the summer of 2000, California experienced significant energy supply problems, sharp increases in wholesale (and retail) electricity and natural gas prices, and isolated blackouts. To mitigate serious shortages and high prices during the summer of 2001, California initiated a variety of programs to encourage energy conservation² and peak demand reduction. During this period, the media also gave a good deal of attention to the energy situation and the public was exposed to a wide range of energy crisis messages from different sources. In addition, energy consumers³ in California experienced increases in their energy bills as a result of these events. Ultimately, significant reductions in electricity demand took place in California during the summer of 2001, and the large number of expected supply disruptions was avoided.

To better understand the nature of these demand reductions and the motivations for consumers to respond to the various stimuli for behavioral change, Washington State University (WSU) undertook research for the California Energy Commission (CEC) that investigated how California consumers perceived and reacted to the electricity supply crisis during the summer of 2001. This report focuses on the responses of commercial sector organizations (public and private). Separate reports examine the consumer response in the residential and agricultural sectors.

The research was designed to consider four key factors that might impact organizational decision-making: informational messages, program interventions, price or rate changes, and external triggering events (e.g., blackouts). The energy situation in California during 2000 and 2001 was unique in that organizations were being exposed in varying degrees to each factor. Applying behavioral research and evaluation techniques, the WSU team examined the response of a sample of organizations to the California energy situation—and particularly why organizations did what they did toward conserving energy. The work was intended to provide insights into the how and why of current reductions in demand, with the hope that the findings can also contribute to the evaluation of past and present program effectiveness, improvement of the Commission's future demand/supply estimates and models, as well as to future program and policy effectiveness.

1.1 The Energy Crisis

California began experiencing electricity supply system problems in the summer of 2000. Wholesale power prices suddenly increased and isolated supply shortfalls began to occur. That winter there were widespread rolling blackouts and dramatic increases in wholesale power prices. Continuing supply shortages were predicted for the summer of 2001, including hundreds of hours of rolling blackouts. In addition, extreme wholesale power prices were creating financial crises for the state's investor-owned utilities.

² In this report we use the terms conservation and energy conservation to refer to a range of actions to reduce energy use, including curtailment and energy efficiency.

³ We use the term consumers to refer to households, businesses, and organizations (and the people that make up each of these groupings) that consume energy and represent the demand side of energy markets.

This energy situation had consequences for public and private organizations as energy users. A small number of retail firms were exposed to very volatile wholesale prices. Some of these organizations altered their operating schedules and laid off staff. Those consumers that did not initially see their electric rates increase were told to expect significant increases in retail electric rates by the summer. Some businesses on interruptible electricity schedules experienced significant load curtailments. The threats of blackouts were a serious issue for many organizations.

However, consumers did respond to uncertain conditions and conservation requests from the governor and other public officials with efforts to reduce demand. Peak electricity demand turned out to be lower than forecast for every summer month, ranging from a 14 percent reduction in June to an 8 percent reduction in March (CEC 2001[a]). Through October 2001, the California Energy Commission reports that the combined savings of demand responsive and rebate/incentive programs was 3,638 megawatts and voluntary conservation savings added another 2,616 megawatts, for a total 6,254 megawatts at peak (CEC, 2002). There were no blackouts during the summer of 2001 and the last stage 3 alert occurred in May.

During the later portion of 2001, and with the imposition of a price cap by Federal regulators, wholesale power rates began to stabilize, once again approaching historic levels. Yet the costs for the energy crisis that were borne by the State of California, some utilities, and some businesses, remain. State contracts and bonds remain to be repaid, and the retail electric rates for most of the state's consumers are higher.

1.2 The Policy Response

In response to the rapidly worsening electricity situation in California in 2000, the state set an initial goal of reducing California's peak demand by 5,000 megawatts for the summer of 2001. To meet this goal, the Governor and legislature took steps to encourage rapid voluntary reductions in demand, and provide incentives for actions that would result in load reductions. In September 2000, the Legislature enacted and the Governor signed into law AB 970 as a first step to achieve the 5,000-megawatt goal. This legislation allocated \$90 million toward load reduction programs targeting the summer of 2001. The legislation also directed the Energy Commission to tighten building and appliance energy efficiency standards (CEC 2002).

In response to growing electricity system emergency alerts and rolling blackouts within the state, the Legislature developed additional legislation to fund peak load reduction efforts. In April, the Governor signed Senate Bill X1 5 and Assembly Bill X1 29. These bills provided an additional \$859 million for demand reducing and energy saving program efforts for the end of the summer of 2001 and all of the summer of 2002. The Governor also launched the "Flex Your Power" campaign, which included paid mass media advertising and an organizational effort that reached state employees, local governments, businesses, and non-profit organizations throughout the state.

The major initiatives pursued by the state to achieve the demand reduction goals included:

- Incentive programs through the public utilities commission and the CEC,
- A media and education campaign (Flex Your Power) to inform the public about the importance of reducing energy use and actions they could take,

- Voluntary efforts by business organizations, companies, local governments, and non-profits to reduce energy use,
- The 20/20 program to reward ratepayers who significantly reduced their electricity use,
- Efficiency improvements to buildings, including low income weatherization and accelerated implementation of more stringent building standards, and
- State facility efficiency improvements to reduce energy demand from state buildings,
- Public utilities commission–administered public goods change programs through the state’s investor–owned utilities,
- Municipal utility public goods–funded programs, and
- Energy Commission administered programs for building and appliance efficiency standards and for improving the efficiency of public facilities.

Between the summer of 2000 and the summer of 2001, the State of California put in motion the most aggressive and comprehensive energy conservation and efficiency effort in state history. The demand reductions achieved and the absence of supply interruptions during the summer of 2001 suggest that these efforts were successful. However, in order to develop successful programs and policies in the future it is important to better understand the motivations behind consumer response to the energy situation that ultimately led to the demand reductions achieved.

1.3 Research and Evaluation Activities

As the CEC planned its response to the demands of this unprecedented energy policy implementation effort, it was recognized that a variety of evaluation activities would be appropriate. At first, two major efforts were conceived: a quantitative analysis led by Nexant to verify installation of efficient technologies and attempt to quantify their impacts, as well as a qualitative analysis led by Washington State University to attempt to understand who was taking conservation actions and why they took them. While the latter research was not intended to be a formal process evaluation, it does focus on several of the CEC commercial/institutional sector programs, considering process issues related to the interaction of these programs and the market place.⁴

Throughout the summer of 2001, a variety of other studies concerned with conservation, demand response and efficiency investment also took place in California—some supported by the CEC (e.g., Local Government Commission 2001), others with funding from other sources (e.g., Hensler, LeBlanc & Siefert 2002; CMTA 2001; Quantum & Xenergy 2001, and Goldman, Eto & Barbose 2002). Several resulted in publications that reported on conservation and efficiency efforts in California (CEC 2002 and CPUC 2002). Ultimately, the various research efforts conducted during this period, which deployed a variety of research methods, led to a variety of observations and reported outcomes (which have yet to be compared, contrasted and/or synthesized). The WSU project’s approach was fairly unique, however. It used *organizational*

⁴ For more information on other research conducted by WSU, see Lutzenhiser, Gossard & Bender (2002a) for analyses of conservation responses in the residential sector, McBride et al. (2002) for an exploration of related issues in the agricultural sector, and Moezzi (2002) for an analysis of media messages.

analysis methods to consider how energy market turmoil was processed within organizations and across organizational networks.

In the remaining sections of this report we:

- Describe our research design, methods, and the data collected,
- Discuss the response of organizations to the energy situation,
- Develop a model of organizational conservation action,
- Consider the program and policy implications of the research, and
- Present our conclusions and thoughts about next steps.

2 Research Design

The energy policy atmosphere leading up to summer 2001 was unique in its core concerns. Success or failure wasn't going to be measured in standard metrics such as cost of conserved energy—it was measured in the ability of California's electricity system to continue to function. As a result, there was a very obvious measure of quantitative success—if the lights stayed on, the policies were successful.

Yet the route to success was far from straightforward. The California energy situation presented commercial sector organizations with an array of choices. The decisions actually made (and the ways in which they were made) were also quite varied. In this section we describe the strategies that we used to understand the commercial sector response to California's energy situation. We describe our research approach, the research questions posed, the research methods applied, and the sample that we developed.

2.1 Research Approach

Given the desire of this research to better understand how and why organizations responded to the California energy situation, we chose to approach our research from an organizational analysis framework. We attempted to gain as in-depth an understanding as possible of the choices made by organizations by conducting semi-structured interviews with members of a variety of organizations, as well as with a group of key informants. We also conducted a media analysis to consider the nature and influence of the energy-related messages received by organizations. We chose this general approach for the research because we felt it to be an effective way to account for two factors that make understanding organizational energy behavior problematic: the complex nature of organizational decision-making and the related complexities of energy consumption in organizations⁵.

2.1.1 Complex Nature of Decision-Making

In the residential sector, there is a relatively direct relationship between the agent who makes energy consumption decisions and the agent who undertakes energy consuming behavior.

⁵ For discussions of the dynamics of organizational decision-making, see Perrow (1986) and Scott (1992). For studies of energy efficiency choice in organizations, see Cebon (1992), Kunkel and Lutzenhiser (2000), Janda (1998), Payne (2000), and Weber (2000).

Consider the case of a homeowner: the same person who receives the utility bill decides the thermostat setting in the house. If the utility bill is high, the homeowner can alter the thermostat.⁶

Consumption choices in the commercial sector, by comparison, can be highly fragmented. The facilities manager who selects the thermostat set point may never see the utility bill and therefore has no knowledge of the cost of such actions. The accounts payable staff member who receives the bill may not have any reason to consider whether the cost of energy consumption could be altered, likely will not know what specific actions would be required to reduce consumption, and almost certainly will not have the authority to direct such actions anyway. The president of the company may have the authority to direct changes in consumption practices but may not know how those changes would be carried out.

Given this fragmented environment, identifying who to interview at what points in the decision-making chain becomes a challenge. However, this realization has been a guiding insight for our research and our approach aims to provide the flexibility to explore these issues of knowledge and control with a variety of organizational actors in order to gain a more accurate understanding of the commercial sector energy environment.

2.1.2 Complex Nature of Energy Consumption

Again using the residential sector as an example, consider the relationship between the consuming entity (the household) and the electricity meter. Only in very rare cases is this not a one-to-one relationship. Furthermore, the energy use behavior in the household is fairly simple and is recorded directly by this meter, making comparison of reported behavior to energy consumption fairly straightforward.

By comparison, the commercial sector's relationship between the consuming entity (the firm) and the meter can be significantly more complex. One location may have many meters. One meter may cover multiple firms (e.g., a strip mall.) One location may receive bills for multiple businesses (e.g., an accounting firm that pays bills for clients). Furthermore, the nature of energy consumption can vary significantly, even within a single firm, often involving a wide variety of equipment, business processes/needs, and operating procedures.

Trying to understand the relationship between energy behavior and reported actions and the firm's energy use is, therefore, far from simple. But, again, this complexity is central to the problem of understanding how organizations responded to the California energy situation and our approach has taken this complexity into account.

For all of these reasons, we chose to use a qualitative research methodology, particularly relying on open-ended, semi-structured interviews with a range of organizational actors. By allowing the interview respondent to help shape the interview direction, we were able to collect a rich data set that presented, in context, our respondents' energy consumption decisions in their own terms, rather than terms we might have imposed upon them (e.g., through mass surveying). By taking this approach to the research problem, we believe that we were able to gather insights that allow new frameworks for understanding decision-making processes.

⁶ Even this description of residential energy consumption is overly simplistic, of course. Energy consumption is often a negotiated activity in multi-person households (Kempton and Krabacher 1984; Wilhite and Wilk 1987).

2.2 Research Questions

What were the research questions we tried to answer in our research? Overall, as we said earlier, we began by considering four key sets of factors that might impact organizational decision-making: informational messages, program interventions, price or rate changes, and external triggering events such as blackouts. To gain a better understanding of these interactions we considered the following overall research questions.

- How did the energy situation affect organizations?
- What actions (if any) did organizations take in response to the energy situation?
- How were decisions made by organizations about how to respond to the energy situation?
- What influenced the decisions organizations made?
- What resulted from any actions taken?
- Will organizations continue taking these actions?
- What factors (such as size, location, and organization type) might account for differences in the responses of organizations?

2.3 Research Methods

As noted, we primarily relied upon the use of semi-structured interviews to collect data on organizational response to the California energy situation.

2.3.1 Semi-Structured Interviews

Semi-structured interviewing allows the researcher latitude in following lines of discussion within the interview. This latitude was important in allowing the development of a rich understanding of the context in which the actors with whom we spoke made their decisions.

To address the research questions identified above, we created an interview protocol. This document served as a point of reference to guide the interviewer in addressing the specific topics identified for discussion, while at the same time being open-ended enough to allow the respondents to report their experiences in their own terms. The major topics in the interview protocol follow the research questions and include the effects of the energy situation, actions taken, how choices were made, participation in programs, results achieved, and future plans. A copy of this protocol is included as Appendix A of this report.

The bulk of the interviews was conducted via telephone. Some interviews were conducted in person, but we found no significant differences in the data acquired from in-person or telephone interviews. The length of interviews varied. Some were as short as 10 minutes if the respondent had taken little action and had little to say. Most ranged from 30 to 45 minutes. Some lasted for an hour or more.

Most of the interviews were recorded on audiocassette. Exceptions included interviews conducted in environments with high levels of background noise and interviews in which the respondents did not consent to be taped. In those cases, the interviewer kept written notes.

Transcripts were produced for a selected portion of the interviews. These transcripts, along with detailed interview notes, provided the textual data for the analysis.

2.3.2 Sampling

After considerable deliberation, we set a target of 100 completed interviews. We had neither the time nor the budget available to conduct a comprehensive large-sample state-wide study. Also, based on the research team's past experience in commercial/institutional sector energy research, we knew that energy use patterns varied so much across organizations that much larger sample sizes (than would be possible given the project's constraints) would be necessary in order to produce generalizable results. The challenge was to sample in such a way that *valid* findings could be produced, without an explicit interest in the precise *degree* or *extent* or *distribution* of decision-making patterns and conservation actions across the entire population of California organizations. The more ambitious research required to address those sorts of questions would require, in any event, the more detailed understandings that we hoped to develop through the use of more qualitative interviews.

We identified three factors, based on the literature, the team's past experience and consultation with outside experts, that might be expected to differentiate the response of firms to the California energy situation. These were: location within the state, type of business, and nature of response. These factors were used to develop the characteristics of our sample (Table 2.1).

2.3.2.1 Location

The geographic location of an organization may be an important indicator of its crisis experience. For example, different utilities were affected differently and this influenced the energy prices their customers were exposed to. Blackouts were more common in some areas than others. There also could be differences between perceptions of the crisis in different regions. Based on these issues regarding firm location, we developed a plan to interview respondents from four regions: the San Francisco Bay area, the Los Angeles metropolitan area, the San Diego metropolitan area, and the Central Valley.

2.3.2.2 Variety of Business/Building Types

There are a variety of building types in the commercial sector. Office buildings and retailers are two of the most common and account for about a third of all commercial building square footage. We therefore wanted to make sure that respondents from these two sectors were included in our sample. A small portion of the sample also included other commercial buildings such as schools, health care or other institutional facilities that we believed could also provide important insights into commercial business energy response.

In addition, there may be differences between how large firms and small firms responded to the energy situation. Firm size has implications for information flow within a firm, how decisions are made, and the resources and capability within the organization. We focused on larger buildings (approximately 50,000 square feet or more) or firms with multiple buildings (chains), but also included smaller businesses within office and retail sectors. Table 2.1 summarizes the distribution of our sample by region and type of business.

Table 2.1. Sample Distribution by Region and Business Type

Target Number of Responses	Bay Area	Central Valley	LA Basin	San Diego	Totals
Large Office	10	7	9	9	35
Small Office	4	3	4	4	15
Large Retail	8	5	6	6	25
Small Retail	4	2	2	2	10
Other	4	3	4	4	15
Totals	30	20	25	25	100

2.3.2.3 Nature of Response

We identified four cases of commercial business response to the energy situation in California (this can be viewed like program participation) that we believe needed to be represented in the sample.

1. Business-as-Usual: The case of no response or change in behavior.
2. Voluntary Energy Conservation Behavior: The case of a voluntary response to price signals, media messages, information, etc. that is often short-term, but that can potentially become long-term habit. No incentive or payment is involved.
3. Consumption Reduction Incentives: The case where some kind of payment or incentive from a utility or CEC program is provided to encourage an energy efficiency action. This often involves an investment in energy efficiency technology that can result in longer-term change in energy consumption.
4. Demand-Responsive Behavior: The case where a participant agrees to reduce energy use during periods of high demand, such as stage 2 alerts, in response to incentives and programs offered by utilities or the CEC. These demand-responsive behaviors are short-term and situation specific.

We expected that the nature of response for some organizations would cut across several of these categories. But we did want to consider whether or not there were differences among organizations depending on which case was predominant. Our sample emphasizes the voluntary and incentive cases (Table 2.2).

Table 2.2. Sample Distribution by Business Type and Action Type

Target Number of Responses	Peak Load (kW) Reduction Incentives	Consumption (kWh) Reduction Incentives	Voluntary Actions	Business as Usual	Totals
Large Office	6	10-20	10-20	1	35
Small Office	0	4-7	4-7	4	15
Large Retail	3	8-15	8-15	1	25
Small Retail	0	3-5	3-5	3	10
Other	1	5-10	5-10	1	15
Totals	10	30-50	30-50	10	100

We also set out to interview 20-25 “key informants”—people who could help us identify unique characteristics of the commercial market and how it responded to the energy situation, as well as help us identify potential respondents. These informants included CEC program managers, program administrators hired by the CEC to oversee specific programs, other energy program and service delivery agents (for example, consultants), and peer organizations.

2.3.2.4 Data Collected

Our respondent sample was not a direct match with our target sample. This was due in part to unanticipated difficulties in acquiring contact information for sector cells of the table, and in part to pursuing additional leads that had not been previously considered (e.g., the statewide and nationwide respondents that mostly represent retail chains). Overall, we surveyed a wide variety of respondents who provided us with a good foundation with which to understand the commercial decision-making context. The final tally of our respondents by building type and location is shown in Table 2.3 below.

Table 2.3. All Respondents by Building Type and Region

Interviews	Bay Area	Central Valley	LA Basin	San Diego	Statewide/ Nationwide	Totals
Large Office	9	5	6	8	0	28
Small Office	2	6	2	4	0	14
Large Retail	3	3	3	1	11	21
Small Retail	0	3	2	0	2	7
Other	3	7	2	2	0	14
Totals	17	24	15	15	13	84

We drew our sample primarily from CEC program participant lists. In particular, we focused on three of these programs—Cool Roofs, Public Sector Loan, and Innovative Peak Load—and we also gathered data from a few participants in the Demand Responsive Program. Information on

how these programs are managed and delivered is contained in Appendix B. We also relied on a small number of referrals from key informants to identify potential respondents.

There is also a small group of respondents that did not complete participation in a CEC-funded economic incentive program, which we refer to as “non-participants.” This pool includes respondents who received CPUC-funded rebates; respondents who tried but failed to complete CEC-funded programs; respondents who took solely “voluntary” actions; i.e., did not apply for economic incentives or publicly commit to changes in consumption practices; and respondents who made no changes in their consumption practices at all. They are therefore not a control group in the standard sense of the term, but rather a group of people who had not experienced full and complete participation in a CEC program. Table 2.4 shows the distribution of respondents by program type and region. The program descriptions in Appendix B show a complete distribution by building type and region for each program, including non-participants.

Table 2.4. All Respondents by Program and Region

Programs	Bay Area	Central Valley	LA Basin	San Diego	Statewide/ Nationwide	Totals
Public Agency	7	3	2	2	0	14
Cool Roofs	5	8	5	3	2	23
Innovative	2	4	3	5	5	19
Non-Participant	3	9	5	5	4	26
Demand Responsive	0	0	0	0	2	2
Totals	17	24	15	15	13	84

Note: A few respondents represented organizations that participated in more than one program. In Table 2.4 the program listed is the one that led to its inclusion in our sample.

We had intended to draw part of our sample from participants in the Flex Your Power Corporate Pledge to represent organizations taking voluntary action, but were unable to obtain a participant list from this program. As it turned out, many organizations that participated in CEC programs took voluntary actions. Ultimately it was difficult to characterize organizations by the action type categories in Table 2.2, because the nature of their response covered several categories. This is discussed in more detail later in the report.

We conducted a total of 21 key informant interviews. Ten of these interviews were conducted with CEC staff contract aggregators and administrator groups associated with the innovative peak load program. Six interviews were conducted with Cool Roofs Program CEC staff and administrator groups. The five remaining key informant interviews were conducted with other program staff, a public utility, a peer organization, and several energy service providers.

2.3.3 Selection Bias

Because our respondents are primarily from CEC program participant lists, it is likely that the bulk of our interviewees were more proactive than the general population. Although our sample is not necessarily representative of the commercial sector as a whole, we took care to counter this selection bias in two ways. First, we located and interviewed non-participants. Approximately 25% of our interviewees in the office and retail sector did not participate in a CEC program. Second, we asked our key informants at the CEC to identify a range of participant responses—

both positive and negative—within their programs. These steps broadened our sample beyond the “star pupils” who are most likely to grant requests for interviews.

3 Findings

In this section, we describe ways in which organizations were affected by the energy situation and some factors that influenced their ability to respond to it. This description includes a discussion of organizations’ energy-related awareness and concerns, technical conditions that shaped their conservation responses, and their institutional capacity to act. We consider these issues for the two main building types in our sample: office and retail⁷ and discuss the effects and persistence of our respondents’ conservation and efficiency actions.

We organize this discussion by building type because the *building type* dimension (of our three initial categories) holds the greatest promise as an explanatory variable. This is only partially because offices and retail stores employ different technologies and have different consumption patterns. More importantly, similar types of organizations tend to operate their properties in similar ways. Some of the similarities within building types are technological. For example, supermarkets couldn’t raise thermostat set points because it increases their energy use due to the amount of cold storage their buildings contain. Public sector offices and non-food retail stores could and did raise their temperatures. However, many of the similarities in the retail sector were driven by sociological forces rather than technological ones. For instance, a corporate energy manager at a national mid-level department store described taking a trip to California to visit several locations. In each location, the manager and his associates walked around in their competitor’s stores to see what actions the competitors had taken. Their choice of what actions to take in their own stores were based upon what they saw others doing in those areas, not on an economic analysis of technical opportunity.

In the following discussions of response in the office sector and retail sector, we roughly subdivide our findings under the headings of organizational concern and capacity. In section 4, we more fully develop a model of firm and government decision-making about energy conservation/efficiency that uses concern, capacity and an added factor—conditions/constraints—as critical dimensions. In that discussion the implications of this model for policy and program development are more fully considered.

3.1 Office Sector

As shown in Table 3.1, we conducted interviews with individuals from 41 organizations⁸ representing the office sector. Twenty-seven of the interviews were with organizations using buildings greater than 50,000 square feet. Fourteen of the interviews were with organizations using spaces smaller than this threshold. Local governments (cities and counties) accounted for 17 of these organizations. Although local governments employ a diverse mix of building types, offices are the predominant type for administrative services. The 24 private sector interviews

⁷ We also interviewed thirteen respondents in several different “other” building types (e.g., hospitals, hotels, schools, a concession service for a national park, etc.), but these results are not presented here. Given that this category was—by definition—idiosyncratic in its composition, a parallel analysis of these interviews with the office and retail sectors was not conducted.

⁸ Organizations where we conducted multiple interviews are only counted once.

included 13 real estate firms that own and manage office properties and 11 tenants or owner occupants that use office space.

The distribution of respondents' participation in CEC programs reflects how our sample was drawn. The majority of local governments participated in the public sector loan program. Some public sector respondents participated in other CEC programs and a few, particularly the smaller local governments, did not participate in any CEC programs. However, some of these non-participants indicated they participated in non-CEC programs.

Table 3.1. Distribution of Office Respondents by Building Size, Organization Type, and CEC Program Participation

	Public Sector	Cool Roofs	Innovative Peak Load	Demand Responsive	Non-Participant	Total*
Large Office						
Local Government	10	1	3		1	14
Real Estate Firms		5	3		1	9
Tenants/Owner Occupants		1	3			4
Large Office Totals	10	7	9		2	27
Small Office						
Local Government					3	3
Real Estate Firms		5				5
Tenants/Owner Occupants		1			5	6
Small Office Totals		6			8	14
Office Totals	10	13	9		10	41

*Since an organization could participate in more than one program, the values in the columns can add up to more than the total.

The private sector organizations participated in a mix of CEC programs. The large private office respondents were evenly split between Cool Roofs and the Innovative Peak Load programs. No large or small offices that we talked to participated in the Demand Responsive program. Small offices either participated in the Cool Roofs program, or not at all.

In this section, we provide a snapshot of the energy-related concerns expressed by our public and private office sector respondents, some technical and network challenges (conditions) they faced, and the extent of their organizational capacity to deal with the energy issues they identified as being important.

3.1.1 Energy Concern of Office Organizations

Respondents reported a wide variety of impacts from the energy situation in 2001. At one end of the spectrum were some office sector organizations that were affected little or not at all by volatile energy prices. Those unaffected fell into the following categories:

- Small organizations that consume little energy (like a small city government). As a fire chief for a small city (who was dealing with energy because of blackout concerns) explained: "We don't use very much [energy]. They are very energy conscious here. So it hasn't had a big impact on our budget."

- Organizations served by municipal utilities. The general partner for a small office building in Los Angeles in this situation told us: “[The energy situation] hasn't affected us, as we are in the city of Los Angeles, and we are served by the DWP. They haven't had an energy crisis, so we haven't.”
- Organizations with fixed price contracts with third parties (like Enron)⁹. The stability of this arrangement was described by the manager of engineering of a national commercial real estate company: “Actually, [firm name] was ahead of the game and they actually had a direct access agreement with Enron so we kind of were sheltered from the energy crisis.”

Although a few organizations felt protected from the energy situation, many did not share this feeling. In general, the office sector was well aware of the energy situation, but different subsectors felt the impacts differently. As we show below, local governments expressed a higher level of concern than private office sector organizations. Large private organizations tended to show more concern than small private organizations.

3.1.1.1 Prices, Budgets, and Profitability

For public sector organizations, the potential impacts on budgets due to uncertainty in energy prices or the potential for sustained high prices was a significant concern. These organizations essentially have fixed incomes and fixed budgets. If costs for utilities go up, then money must be taken from other budget categories to compensate for the shortfall. Impacts on energy budgets were reported to be as much as 50 to 100% greater than previous years, although in some cases this reflected anticipated budget impacts rather than actual impacts. The assistant county administrator for a county in Northern California expressed these concerns:

It has really been a big budget issue. Our energy budget doubled from 6 or 7 million to I think a budget of 12 million for this year. So it has had a big financial effect. That was the main impetus for trying to be more energy efficient. (#8)

Private sector office organizations were less concerned about the budget impacts of the energy crisis and more concerned about maintaining their profitability. Energy cost increases per square foot are small relative to building rents, which range from \$25 to \$45 per square foot. The vice president of engineering for a large office real estate firm put their energy costs into perspective for us:

We had a 230 percent increase, I believe, from January to January, 2000 to 2001, in San Diego which really equated to slightly less than 2 cents per square foot when escalated to multi-tenant properties. (#25)

In addition to costs being small relative to rental revenues, many real estate and property management firms are able to pass on increases in energy costs directly to their tenants. When asked if he had done any efficiency improvements other than installing a cool roof, an owner of a small real estate company said:

⁹ Subsequent developments with this company, of course, engendered their own kind of volatility.

You know, I know I should. I know I should do more, but I'm just kind of apathetic about it. I pass the energy costs on to my tenants, and the cost just doesn't matter. (#104)

Tenants either pay energy costs, or in situations where the owner pays, clauses in the lease often allow costs above a base level to be passed to the tenants.

3.1.1.2 Blackouts

Early spring blackouts and the threats of summer blackouts were an important motivator for both public and private organizations to take action.

Private sector office buildings felt vulnerable to blackouts. They were concerned about the value of lost business (to both themselves and their clients) and security issues. A facility manager for a California credit union told us:

We had many branches that were caught up in the outages where we had to literally shut our doors. Our security systems are electronic, and we can't run 'em without electricity. (#63)

Beyond loss of business impacts in the private sector, many of the local governments we spoke to said their concerns were related to potential health and safety issues. As an energy and environmental manager for a city in Southern California described:

So our focus was to reduce our use and encourage others to reduce their use to prevent blackouts. So it was a public health and safety issue. We spent about a half million dollars without incentives to retrofit our traffic lights with battery backup power. About 150 lights. That was important. Beyond cost, the other issue was public health and safety issues. (#41)

Several jurisdictions mentioned traffic fatalities that occurred during blackouts that they believed were caused by dark traffic lights. The city energy and environmental manager explained the impetus behind their action to retrofit their traffic lights:

One of the blackout incidents that we had—we had a fatality accident in [city name] that involved a 4-year-old girl. We did not want to see those types of things happening. (#41)

These potential health, safety, and economic impacts were strong motivators for local governments to take action to avoid blackouts.

3.1.1.3 Public Expectations

All the media attention helped to raise the profile of energy for organizations, their staff, and their customers. This attention affected organizations both in helping to enable them to take action and wanting to visibly show that they were doing something. For example, the governor directed government organizations to reduce their energy use. The facility manager for a city in the Central Valley who has been a long-time advocate for energy efficiency observed that the efficiency and conservation message was being widely proclaimed. As he put it:

A lot of people want to get in and play the game. You have everyone like the California League of Cities. Everybody in the valley is sending e-mails to one another throughout the state. It is something that here in central California you do not have to pay too much attention to because everyone is crying wolf: "Shut it off." I have been asked: "How come you are not banging on doors and telling us to shut it off?" Well, you've been told by your news media—every possible

media in California is preachin' it. So those of us that used to do it don't have to. It is kind of a breath of fresh air. Someone else is crying wolf. (#4)

Because of public perceptions about the energy situation, local governments recognized the importance of showing they were doing their part. The public relations value of an action was an important decision-making criteria for local governments. They wanted to take actions that were visible to the public or their customers. This desire for visibility was described by a city director of facilities:

When we were told to look at facilities and see what we could do our first reaction was, there is not much we can do with lighting, but that is what the public sees. We wanted to have something that when the public walked into a building they would say that the city is doing its part. That is why we choose de-lamping. We felt that we had to follow suit with other retail places that were de-lamping. (#6)

While private sector office buildings are generally less accountable to the public in general, their management/tenant relationships constitute a similar dynamic. In a few cases, tenants urged their landlords to take action on their behalf. The owner of a small family-run commercial real estate firm said that as a result of the energy crisis:

We have had more input from our tenants trying to find out what it was we were doing to make things more energy efficient. Not only for the common areas but also for the premises, their suites which they were paying directly. Had quite a few phone calls about timeclocks, sensors, things of that nature. (#94)

An engineering manager for a large office real estate firm described how his company informed tenants about their conservation responses:

They have little screens in their elevators and they also put signs out for tenants to see where it says that the building is trying to conserve energy by reducing the amount of lights in the common area and they just try to keep reminding the tenants that this is going on. Some of the tenants have actually gone and reduced some of their interior lights also. (#26)

3.1.1.4 Macro Trends

The events of September 11 encouraged local government and office building owners to focus more on providing secure, stable workplaces. In some cases, security concerns pushed energy concerns out of the limelight and tabled projects that were scheduled to take place. Likewise, the downturn in the economy during 2001 has impacted local governments and private sector office organizations. This can stimulate actions to reduce overall operating costs. However, economic hardships create uncertainty and can stall the investment of resources into efficiency actions as described by a representative of an office building peer organization.

As the economy got hit, all of a sudden high-rises were scrutinized because of Sept. 11th. I found that some of the biggest players have put a hold on projects because there is a lot of uncertainty about occupancy, about the buildings. When there is uncertainty people don't act. (#28)

3.1.2 Energy-Related Conditions of Office Organizations

Some of the office sector organizations we spoke with had a sense of urgency and believed they needed to respond quickly to address price and budget concerns as well as public expectations. This feeling of exigency was particularly true for the local governments, where these concerns were significant. This often led to operational type actions such as changes to thermostat settings and operational schedules, turning off lights and equipment, and other conservation type activities. The majority of local governments we spoke with implemented these types of short-term changes as described by this county administrator.

The short term was more cost containment and self-sufficiency. Making sure departments shut off the lights when they were not using them. [G]oing around and putting in motion sensors in public areas, like conference rooms. There is a whole litany of things that ... we initiated in the short term. (#11)

Real estate firms were more limited in the types of operational changes they could make due to the requirements of their lease agreements with tenants. Most firms we talked to would not raise the cooling set point in a tenant space, change the hours of operation, or turn off the lights. A manager for a high rise office building in San Diego said:

The one thing I absolutely refused to do was up the temperature in the tenant spaces. You just can't do that to your customers if they're Dean Witter and Morgan Stanley. (#130)

In particular, commercial real estate firms felt they could not voluntarily interrupt power to their clients, which limited their ability to participate in some types of curtailment or interruptible programs. As a vice president of engineering for a national real estate firm explained,

Commercial real estate is really dependent on electricity.... We need to be up to run our business machines. All of our tenants need lights to do their work and have their computers on and the printers.... We cannot shut off the electricity on demand. Not only would it violate the covenants of the lease, but it would not make any sense. We cannot sit here in the dark. (#25)

Although commercial real estate firms were reluctant to take conservation actions, we did find real estate firms that were reducing lighting and air conditioning in common areas and more tightly monitoring after-hours use. One organization had even developed curtailment plans for implementation during stage 3 alerts.

There are also progressive office firms that have improved the efficiency of their buildings because it made business sense. The vice president of engineering for a large office building real estate firm commented on how previous efforts to improve energy efficiency limited the ability of his organization to take further action in response to the California energy crisis.

Now you take a company like [firm name], and there are not many in the industry like us, we did these things [efficiency improvements] before the emergency. So the only thing the state has offered is the I6 project and maybe some additional money for future energy projects. Well, we already did all our buildings and lighting retrofits. (#25)

These larger office organizations managing higher quality office space often have well developed capital improvement plans. These plans have an influence over what an organization might do in the short term in response to a situation like the energy crisis in California. The

manager of engineering for one of these firms describes how they proceeded with planned equipment replacements and upgrades, including projects that improve efficiency:

Actually, this year we are in the process [of] installing VFD's (variable frequency drives) on all of our air handlers in one project. We are installing VFD's in that building to help reduce energy consumption and make it a more pleasant climate for the tenants. We are also putting in an energy management system. In this project here, we are budgeted to replace the energy management systems. All of our buildings have some type of energy management system installation or upgrade. It's going to happen in 2002 to the rest of them. (#26)

Projects also need to consider the operational needs of the organization, as this utility account manager for a city explained:

Obviously, we had to consider the operational needs for the city. So we could not say this pump is the biggest consumer waster if we take it out and replace it we could impact the water supply to all our customers. So operational impacts were considered. (#2)

Ultimately, the conditions or circumstances at each organization provided both opportunities and constraints on possible responses to the California energy situation. The need to respond in a short timeframe increased the significance of this issue.

3.1.3 Energy Capacity of Office Organizations

When making decisions about actions involving efficiency improvements to their buildings, organizations considered things they were already planning to do, problems that needed to be addressed (repairs/replacement of failing equipment), and what was possible.

In some cases the energy situation accelerated planned or needed actions. This situation was common for the local governments participating in the public sector loan program, which provided loans and grants for many types of energy efficiency measures. The short window of opportunity to apply for this program favored organizations that had already planned projects. For example, the chief financial officer for a Northern California city describes their decision to replace their HVAC system and controls.

Well, it's more utilitarian. Our HVAC system was failing us. The boilers were very inefficient and breaking down. Our HVAC controls were inadequate to adjust to the different zones of the building. We decided some time ago that it wasn't in our best interest to continue to patch. We needed to replace the boilers with state-of-the-art high efficiency boilers. We did that. We were looking at the HVAC controls when the CEC came out with their loan program. So we put in our application right away. We knew what we wanted to do. So it was really prompted by the fact that our system and just about any system that is 10 years old or older, is not nearly as efficient as what is on the market right now. So it just worked out for us that we needed to do it. And the timing was made even more right by the energy crisis. It made our payback accelerate. What would have taken 15 years for a payback all of a sudden was 10 years. (#7)

Some commercial real estate firms found their efficiency opportunities were limited by their ability to convince their tenants it was in their best interest to upgrade. An owner of a small, family-run real estate firm in the Central Valley told us:

You're not trusted. They just think I'm trying to get them to improve my building at their cost. When I try to explain to them that it doesn't really matter to me because the tenants always pay their utilities, and they always have, and they always will, probably. So I don't care, per se. But it

makes sense for two reasons: (a) it saves you money and (b) it saves power. But they always thought it was me trying to "one up" them. It's an adversarial position. (#94)

3.1.3.1 Experience and Know-How

Organizations drew on their past experience and knowledge to identify how their organization should respond to the 2001 energy situation. Many of the local governments and office building real estate firms we spoke with had some past experience with energy efficiency or conservation efforts. In some cases these efforts were ongoing, while in many others they had lapsed or were one-time events. Local governments and larger real estate firms relied largely on their own knowledge and capability to make decisions about actions. An assistant county administrator alludes to this in describing how they identified the actions they took.

There are a number of people who have been through this already with the '70s energy crisis. We just threw out a bunch of suggestions. They are not that [complicated]—you have your basic conservation stuff and your facility retrofit stuff. They just came based on people's experiences. (#8)

An organization's experience and awareness were important and allowed some local government organizations to respond quickly to opportunities like the public sector loan and grant program, which was only open for a short period of time. This is expressed by a county director of management services.

Again I think the fact that we do have a history of that here in the county really helped, because all of that kind of stuff was built in. As [the manager of facility operations] says, his staff was very sensitive to those sorts of things. So they're aware. So that positioned us very well to respond to this and to take advantage of the new programs the CEC put out or anything else. We are probably in a better spot to do that. Because we were ready to issue RFP's for lighting upgrades or contractors to put in motion sensors. So I think that positioned us well. Then the programs that came out we were able to take advantage of a lot easier than maybe others. (#11)

The director of facilities management for a city describes how a previous project and experience helped them implement an air-conditioning project.

The air-conditioning projects that we chose, we looked at the chillers that we had already done and we have all of that information in a data base with model numbers, age of equipment, energy efficiency ratings so it was easy. Basically a slam-dunk. We called up Carrier and told them "We have a 5 year old 6 ton unit with an EER of 10, what can we do today? What kind of pay back are we looking at?" Carrier provided us with software for calculating a payback period on packaged units. So basically we got the information on the new units; we plugged it into their software and were able to do the calculations on savings. (#6)

The most sophisticated office firms provided documentation and guidance for potential energy efficiency projects. The manager of engineering for a large office real estate firm described the system developed by his company.

They have put together a list of efficiency types of items to look at.... It is on our Intranet that gives each property a guideline on what [company name] looks at for energy efficiency. So what they do is they have an introduction for energy reductions that can be done immediately, and then they go down into capital intensive energy saving projects. (#26)

The energy crisis attracted the attention of top decision-makers at local government organizations. In many cases an individual was appointed to be responsible for developing an organizational response to the energy situation. These individuals were often part of the general administration or facility management for their organization. Energy teams or committees were formed and plans of action were developed. Many of the public organizations we spoke with developed an energy plan in response to the energy situation. Some already had energy policies or procedures that they dusted off. These plans provided guidance for the energy decisions that were made. For some public sector organizations, development of the energy plan was the process they used to identify actions. These plans may influence future energy decisions.

The energy plans often focused on operational type changes to reduce energy consumption. In some local governments the proposed procedures were mandatory, but in most cases they were voluntary guidelines and various government departments or groups were encouraged to follow them. The individuals we spoke with reported that the response to proposed guidelines was very positive.

Smaller office organizations have less staff available to address issues like energy. There may be a local building manager, but outside contractors are often used for things that go beyond day-to-day operations. Usually energy efficiency receives little attention and these organizations have little capacity to pursue energy efficiency.

The individuals from several small local governments we spoke with played multiple roles within their organizations. For example, in one case the fire chief was dealing with energy issues because of the health and safety implications of the energy crisis. The participants in the public sector loan and grants program we spoke to all tended to be larger jurisdictions, suggesting that smaller organizations were less able to take advantage of this program.

3.1.3.2 Organizational Attention

In terms of an organization's capacity for taking energy efficiency actions, attention from the top levels of the organization is often an important factor in how seriously the actions are pursued. The energy crisis got the attention of key decision-makers in many public and private organizations. In many cases the impetus for action came from high in the organization and actions developed by staff in the organization seemed to be quickly adopted and supported by key decision-makers. This was critical to making decisions in these organizations to take action. Many people we spoke with, as expressed by the director of management services for a county, shared this view. As he put it:

Probably the thing that this energy crisis has done is brought it to a level of management at the ultra senior level who look at gross budget and say "My god, our budget is shrinking as it is. And now we are going to increase the cost of utilities." That has been very powerful and that is where all our support is coming from. (#11)

A facility manager for a California credit union agreed:

The corporate priorities changed with the energy crisis, and therefore it changed mine. (#63)

Although the power to make things happen may come from top management, it is important to note that the know-how and ideas often come from the employees who handle facilities on a day-to-day basis.

3.1.3.3 Third Party Assistance

External organizations played a role in the decisions that organizations made and helped increase the capacity to act. Both public and private organizations used peers and peer organizations as sources and models for actions they could take. For example, many local governments relied heavily on their peers to develop their energy plans.

Utilities and account representatives were used by some organizations for audits and as sources of information for actions they could take. This included information about the programs they offered and assistance with applying those programs. This was also true of program administrators for CEC programs. In some cases this influenced the decision an organization made as described by this city director of facilities management.

The LED project was identified after Edison came to us as they had that funding mechanism in place. They told us about the project, we sat down to make out calculations together, did some projections on the intersections. It was a very positive number with a potential of 70%+ savings on our traffic signal electric costs. It was clean and easy to figure our savings. (#6)

Energy service companies were used in some cases to do projects for participants in the public sector loan and grants program. In these situations the information provided by the ESCO was important for the decisions that were made.

Because most organizations had not budgeted for the energy crisis, they were trying to stretch their dollar investments as much as they could while trying to reduce their operating costs. They only had the capacity to do things that did not cost much, or that had short paybacks, or that had incentives. As described by this energy and environmental manager, they were trying to get the most bang for the buck.

Criteria was where can we get our most bang for the buck. Conservation does not cost you anything so that was a major item. As far as energy projects—the green traffic signal lights were less than a year payback, so that was a slam-dunk. Our avoided cost after payback is money in the bank. (#41)

The desire to do things that did not have budget impacts resulted in operational changes being one of the most common actions taken by the organizations we spoke with. These include such things as changes in thermostat settings, changing operational schedules, turning off lights and equipment, and other conservation type activities. Commonly, these actions were relatively simple for organizations to implement, could be done quickly, and were generally supported within organizations because of widespread awareness of the energy situation. These quick actions were the actions organizations had the capacity to take first.

3.2 Retail Sector

As noted in Table 3.2, we conducted 27 interviews in the retail sector. Twenty of these interviews were with respondents at large retail facilities. These interviews included: five national full-line department stores, eight national big box or stand-alone specialty stores, three shopping malls, three grocery stores (two national and one statewide), and one car dealership. The seven small retail interviews included a regional chamber of commerce, two local strip malls, an independent convenience store, a national lingerie chain, a pawn shop, and a national drugstore chain.

Table 3.2. Distribution of Retail Respondents by Building Size, Organizational Type, and CEC Program Participation

	Cool Roofs	Innovative	Demand Responsive	Non-Participant	Total
Large Retail					
Full-Line Department		1	1	3	5
Big Box/Specialty	3	3	1	2	8†
Shopping Center	3				
Grocery	1	2	1		3*
Car Dealer	1				
Large Retail Totals	8	6	3	5	20*†
Small Retail					
Chamber of Commerce		1			1
Strip mall	1			1	2
Convenience Store	1				1
Lingerie		1			1
Pawn Shop				1	1
Drugstore		1			1
Small Retail Totals	2	3	0	2	7
Retail Totals	10	9	3	7	27

*Total does not add correctly because one national grocery store participated in two CEC programs: Demand Reduction and Innovative Peak Load.

†Total does not add correctly because one big box store participated in two CEC programs: Cool Roofs and Innovative Peak Load.

These stores participated in a mix of CEC programs. Slightly more than a third of our retail respondents participated in Cool Roofs. A third participated in the Innovative Program. A few large retail organizations in our sample participated in Demand Responsive, although no small ones did. As noted below, only two stores in our sample (a national grocery and a big box home improvement store) participated in more than one CEC program, although several respondents noted participating in other utility rebate programs. We also talked to a number of large and small retail organizations that did not participate in any CEC program.

In this section, we provide a snapshot of the energy-related concerns expressed by our retail respondents, some technical and network challenges they faced, and the extent of their organizational capacity to deal with the energy issues they identified as being important.

3.2.1 Energy Concern of Retail Organizations

Most retail respondents, whether large or small, were concerned about energy last summer. This concern was generated primarily by rising costs and public opinion. Different stores were

motivated by these factors to different extents. One high-end department store's facility manager said that the major effect of the energy situation was: "it reduced [our company's] profitability." (#124). Although this large company's profitability was impacted, it was able to absorb the burden of higher energy costs at the corporate level. For some smaller companies, the situation was more dire. As the chamber of commerce for a Central Valley region told us, "Utility bills for some of our members went up by \$400 – \$800. For a small business, this amount is the difference between staying alive and going under." (#122) Not all small businesses felt this way, however. The owner of at least one independent convenience store was unabashed by rising costs:

Everyone knows that there is a power shortage and the cost of energy has increased. And they understand that the cost of goods goes up, too. They come in and buy a gallon of milk. Before the crisis, they were paying \$2.50 a gallon. So now they're paying \$2.60. For us, it doesn't matter. (#88)

Although cost was an important motivator for many, for some retailers it was secondary to public relations. An energy manager for a big box chain put it this way:

All retailers are subject to public opinion. And we're all energy hogs. Because it takes a lot of energy to run these big facilities.... Of course, you know, we have the resources and the dollars to run these facilities and run 'em wide open. And could. But for public sentiment. Our customers come in and yell at us: "Don't you understand there's energy constraints? Why are you running all these lights?" (#150)

For this retailer, *looking* like his company was saving energy was more important than saving the energy (or the money) itself. For other retailers, who served a slightly different public, appearances were important in the opposite direction. A consultant for another upscale national department store (#144) said the upper management at this establishment was reluctant to "harm the shopping experience" by shutting off lights or turning up the thermostat. Yet this company, like other high-end retailers, was feeling the effects of the downturn in the economy and was concerned about its expenses. So it participated in the Demand Responsive program, which allowed it to maintain the daily level of lighting and cooling it deemed necessary and only curtail when absolutely necessary.¹⁰

3.2.2 Energy-Related Conditions of Retail Organizations

Various kinds of technical conditions were an important factor that respondents cited as shaping their energy conservation and efficiency choices. In particular, the presence or absence of an energy management system was a key point. As the manager of a Bay Area shopping mall said "I don't have an energy management system. We're not that sophisticated." (#147). In comparison, several of the big box stores (#71, #150, and #133) and the national lingerie chain (#141) had the ability to control and monitor lights and HVAC systems from a single central location. This central point is usually the "home" or corporate office, which is often more than a thousand miles away from the stores in California.

The presence of an energy management system, however, does not guarantee it works properly or grants the desired level of control. The energy manager for the department store that was

¹⁰ Demand response programs encourage, enable and/or require reduction of peak demand during times of high system loads, high wholesale prices and/or system capacity emergencies.

unsuccessful in winning a Demand Responsive grant had the following to say about his company's efforts to upgrade their control systems:

We were probably one of the first companies to put EMS systems into our stores 20 years ago. But a lot of those systems you can't buy parts for. So you got a lot of relay panels just sitting out there ... just dead.... We needed to come up with an engineered standard that would be able to adapt all these different brand systems out there. I've got old systems. I've got old Climatron systems, we have IDMA systems ... all these manufacturers are all like in the 60s, actually, the 70s, 80s, 90s generations of EMS hardware. (#160)

In addition to the presence and condition of controls technology, the diversity of an organization's building stock also affected its ability to respond like its peers. The energy manager for a big box store claimed that all of his 500 stores are "virtually identical" (#150), as they were all built within the last five or six years. This similarity makes energy planning and estimations much easier than for a chain that has greater diversity in its building stock. One department store, for instance, had a slight problem with an internal awards program it developed for store managers as an incentive for pursuing energy efficiency. In this program, managers could gain credits by implementing various energy efficiency measures and exchange them for a percentage of their utility budget deficit, which the corporate office would then absorb. Occasionally, the awards program gave target bulb reduction numbers that were larger than the number of lights in the building. "Our buildings," said the energy manager for this company, "aren't cookie-cutter buildings." (#124)

3.2.3 Energy Capacity of Retail Organizations

Interspersed in the respondents' comments about technology were issues related to the capability of their organization to control and/or motivate people. For example, in comparison to the flexible award program at the department store described above, other large retailers we talked to rarely allowed store managers to make decisions locally. A consultant for another department store said: "We have a different organization. Where the directive for how you operate comes from the top-down. And you don't go against the top." (#144). Just as there are degrees of technical control, there are variations in organizational capability to assert dominance or ascertain compliance. An energy manager from the national lingerie chain described how she uses information from their EMS to keep track of store managers' behavior:

Because we do keep track of how they're doing, right now, not just in CA but everywhere. And we do kind of police them a little bit with the energy management systems that we have. And let them know that "This month you're saving this much energy by doing what you're doing. Keep it up." Or "Hey, you need to do something." (#141)

And just as there are different qualities to EMS systems, some personnel are better or worse equipped to deal with energy issues. An energy manager for a drugstore chain described his frustration with having to provide in-store contacts for the CEC program his company participated in:

What's the difference if they know the name of the store manager or not? I can't reasonably provide that to them with any degree of certainty. That district manager may change that store manager tomorrow. I don't know. And yet that's a requirement. And the phone number. Why would they want to contact store personnel? Store personnel have no idea what's going on.... Quite frankly, they don't know the difference [between lighting technologies]. Why question

someone who has no knowledge of what's going on? They think of a lamp as something that is on a table. (#158)

Relying on people rather than technology isn't perceived to be a bad thing in all organizations. For at least one department store, the energy manager considers the store personnel an asset:

Basically, the store personnel—because we're not automated—are focused to reduce energy during non-customer hours. So if you go into a [company name] store off-peak, when there's no customers in the store, there's going to be 25% on peak. And this has taken years. We've got an ethic that is probably one of the best in the industry since we don't have automated controls. I've been with other retailers and [company name] definitely has the best program. For what we do with the staff and the personnel in the field. (#160)

Finally, there is the size of the energy management team, the extent to which it is integrated within the company, and the power it seems to be able to exert. All of these factors give some sense of energy's relative importance in the corporate structure. Although the energy manager quoted above seemed proud of the store personnel, he also lamented: "My counterpart at Wal-Mart has 35 or 40 people working for her. I'm just one guy."

3.3 Effects and Persistence

Generally our respondents had a favorable view of the results of their actions. Many believed they had reduced their electricity demand and that this contributed to the lack of blackouts. Staff responded positively and customers had few complaints. They felt their actions helped to mitigate the negative effects of the energy crisis on their organization.

Organizations believed the actions they took were producing energy savings. Some believed they were saving 10–20% relative to the previous year, although they recognized that they did not yet have the data to show this. A county administrator acknowledged:

We can't demonstrate it because we haven't got the data in the right program every month. But my guess is that we are somewhere between 10 and 15 percent at least over everything that we are responsible. (#11)

Our interviews indicate that much of the initial energy reduction resulted from the quick, voluntary conservation actions like shutting off lights and raising thermostat levels. Longer-term projects are underway and the full savings impact from all actions may not be evident for quite some time. The utility account manager for a city described this tiered effect:

Most of the stuff right now for the CEC program are in progress. The LED traffic signals we will have in by December.... I expect 70 to 80 percent reduction from that. Still, we are currently running with just the reduction policies and everybody paying attention to energy efficiency in their buildings, from the previous year this last month we were running about 8.5 percent under previous year. So people, it is still in their mind. They're still doing it. (#2)

Feedback from organization staff and customers ranged from positive to neutral acceptance of the need to take conservation action. This range of response was evident between organizations and even within them, as indicated by comments of the corporate energy manager from a national retail chain:

I think a lot of the guests were very, very supportive. It was very well understood through the media exactly what was going on. And the guests appreciated we were doing something and not acting business as usual. I don't think our store-merchandising people appreciated it. They like it to be bright and comfortable. So it kind of slapped in the face of their philosophy to be operating more dim. But they bit the bullet. I think we had pretty much 100% cooperation. (#21)

In many cases, actions that had been assumed to require discomfort or inconvenience were seen as “not being all that bad.” In some cases, energy efficiency actions actually produced unintended non-energy benefits. For example, a respondent from a car dealership in the Central Valley (#148) told us that when he turned off his nighttime security floodlights he saved money and decreased vandalism. Instead of using the security lights all night to protect his inventory, he hired a security guard. The security guard was cheaper than the lights and had the added benefit of deterring local teens from frequenting the premises after hours. The dealer got a cleaner car lot for less money.

Likewise, energy projects often provide improved levels of comfort due to the application of better technology and good design. The deputy director for public works for a county described their positive experience with a lighting retrofit as:

One of the things we have seen in the buildings that have had lighting retrofits so far is that the lighting is very pleasant.... The new tubes we are using in these buildings are very similar to what we're used to, it is a soft lighting. There is enough illumination to do what you need to do at your work area. It has just been a pleasant experience so far. I am not aware of any complaint whatsoever with any of the buildings we have finished with the level of lighting or quality of the lighting. It seems very successful. (#10)

Although it is clear that time is needed for organizations to fully judge the effects of their actions and whether this experience supports continuation of their efforts, our respondents generally felt their conservation and efficiency actions would continue. The continuation of these efforts will likely depend on the nature of the actions. The connection between action type and the likelihood of its continuance was outlined by an assistant county administrator:

You know with the conservation part—where we have replaced refrigerators and so forth where we are actually reducing demand—that obviously will continue. The stuff that is more voluntary conservation—I think we have raised consciousness about it. Hopefully that will continue into the future. I am sure there will be some slackening off, there has been already. But I think in general people have gotten into the habit of turning off the lights. I think a pretty large percentage of it is permanent. But now that it is not quite such an emergency situation there will be some slackening off. (#8)

4 Program and Policy Implications

Between the summer of 2000 and the summer of 2001, the State of California put in motion the most aggressive and comprehensive energy conservation and efficiency effort in state history. The demand reductions achieved and the absence of supply interruptions during the summer of 2001 suggest that these efforts were successful. In this section we first consider what our research has to say about this effort (focusing on the three programs we considered). Then, based on our research findings, we develop a model of organizational conservation action that can serve as a guide for future program and policy development. We use this model to provide some

ideas for maintaining and expanding energy efficiency and conservation actions by commercial organizations.

4.1 Program Observations

We drew our research sample primarily from three CEC programs—Public Sector Loan and Grants, Cool Roofs, and Innovative Peak Loads. Our intent was not to evaluate these programs, but our research did have an evaluative aspect. In the course of our interviews with program participants, managers, administrators, and aggregators, we gained some valuable insights about these programs. For each program we offer some observations about program delivery.

4.1.1 Public Sector Loan and Grants Program

The State of California has had a public agency loan program for almost 20 years. In response to the energy situation in California, a new program was developed in 2001 to encourage higher levels of energy efficiency and demand reduction in public facilities. The new program is a continuation of the previous loan program and uses the infrastructure developed for that program. The new program used two elements to encourage high participation and quick project completion: a below market 3 percent interest rate on the loan and an early project completion incentive that provides a grant for a portion of the loan amount if the project is completed by a certain date. This amount ranged from 10 percent if the project was completed by September 1, 2001 to 3 percent if it was completed by May 1, 2002.

The new loan program began in May 2001. The legislature allocated \$48 million for the program. In two months the CEC received enough applications to use all of their funding and by September the allocated funds had largely been encumbered. The response to this program was much faster than the historical loan program, which disbursed \$66 million over its life.

Loans were granted to 84 sites. More than half of these projects involved energy service companies. Most of the participants were cities, counties, colleges, and hospitals. In the past, K–12 schools accounted for about half the loan program participants, but represent a much smaller portion in the current program.

We spoke with 15 participants in the public sector loan and grants program and with nine other public institutions, several of which applied to the loan program, but ultimately did not participate. It should be noted that we focused on participants implementing building efficiency projects rather than non-building projects such as LED traffic signals. The participants mentioned a variety of sources that they used to find out about the program including web sites, e-mail, peers and organizations, energy service companies, and mailing lists. Some did not recall exactly where they first heard about the program. As one Business and Operations Manager noted, “I get information all the time from the state.” A few participants said they had participated in the loan program in the past. The rapid response to the program suggests public organizations heard about and were familiar with the public sector loan program.

Public sector organizations operate on fixed budgets with many competing demands for funding. The loan and grant program provides value by allowing public institutions to obtain the capital to implement projects as noted by this city energy manager:

The loan money is how we finance projects without using funds we don't have. We do not have the money sitting around to do these projects. (#5)

And the below market loan rates and grants reduce institutions costs, help accelerate their return on investment, and make more projects feasible.

But in many cases, the individuals we interviewed indicated they would have implemented their projects without the CEC loan funds. The organizations had already identified projects they wanted to do and had started project development. The program allowed them to stretch their limited resources by providing grants and below market loan rates as this director of management services explains.

They have enabled us to do more than we thought we were going to be able to. It is an important component to us, but it is not the only one. As I said, we budgeted 1.8 [million dollars] without consideration of whether we would qualify for the CEC loans or not. The CEC loans let us put these micro-turbines in because they were not as high a priority as the lighting upgrades. So in that sense they helped accelerate some of the projects that we identified. (#11)

The short window of opportunity to apply for the loan and grant program before the funds were expended favored organizations that had projects already underway. We expect that this favored larger organizations that were already pursuing projects on their own. It may also explain the significant involvement of energy service companies in the program because public organizations were using these firms to implement these projects.

It is not clear whether the early completion incentives caused projects to be completed more rapidly than they might otherwise have been. It seems that some organizations were using the early completion dates as a target for completing their projects and this helped move these projects along. They signed up for the program in part because they believed they had a project that could be completed in time to receive a grant. But there are a variety of factors that dictate project schedule that an organization may have little control over and we did not find much evidence that organizations were trying to speed up their projects to get an incentive. Those projects that were finished quickly were likely ones that had completed early development work prior to the launch of the loan program and were already on a schedule that could meet the program's early completion dates.

The participants we spoke with were quite satisfied with the loan and grants program. The comments by this energy manager capture most of the positive comments we heard.

It is straight forward. The staff are reasonable. It is fair. They are generous without being careless. They exercise a reasonable amount of caution. There is good shepherding going on through the project. The staff is dedicated. I've got nothing but good things to say. (#5)

However, we spoke to several public organizations that applied to the loan and grants program, but ultimately did not participate. One ultimately was able to use already approved capital bond funding that was easier to use than the CEC funds. Another organization could not free up the engineering resources to conduct the savings analysis for the formal application.

The participants offered the following recommendations for making it easier for public organizations to participate in the loan and grants program.

- Provide a streamlined application process for certain simple measures, such as lighting projects.

- Provide engineering assistance or relax engineering requirements.
- Offer the opportunity to establish a master application that would allow additional projects to be submitted under the master application with reduced paperwork requirements.
- Provide an appeal process for cases where a request for funding for an energy efficiency measure is denied.
- Provide some portion of the loan money prior to project completion so the organization does not have to front all the money for the project until the loan is disbursed after project completion and inspection and approval.
- Provide stable funding and incentives. It is hard for organizations to expend resources to plan projects if they do not know whether funds will be available to support the projects. The pot of money was quickly committed and many public organizations did not have the opportunity to participate.
- Provide clear up-front requirements so organizations know what resources they have to invest to apply for the program and they are not faced with having to provide more information and details than they planned for.

Our observations suggest that the public organizations participating in the loan and grants program found it to be an excellent way for them to support energy efficiency actions they planned. The below-market loan rates and grants made it easier for them to justify and implement projects, while providing an opportunity for them to respond to the energy situation.

4.1.2 Cool Roofs Program

The Cool Roofs program promoted the use of reflective roofing materials as a means of reducing the peak load related to air-conditioning. Currently less than 5% of roofs in California are light-colored, even though cool roof products have similar costs to more common dark products. The program was designed to increase awareness of cool roofing materials and provide an incentive to encourage the use of newer cool roof products.

This program was available to non-residential and multi-family buildings that were mechanically cooled in summer and located in 14 of California's 16 climate zones. The CEC worked with the Local Government Commission (LGC) to coordinate the Cool Roofs Program with the help of a set of four program administrators. The four groups that administered the Cool Roofs program were: The Sacramento Tree Foundation (STF), the Los Angeles Department of Water and Power (LADWP), the Sacramento Municipal Utility District (SMUD), and the San Diego Regional Energy Office (SDREO).

Each of the four administrators worked within a different geographic area. The administrative boundaries of these areas were clear for both the municipal utility districts (SMUD and LADWP), but were more amorphous for the regional non-profits (SDREO and STF). This meant that a building owner in some southern areas of the state might possibly apply to either STF or to SDREO for assistance. Participation requirements were not the same across administrative boundaries. Some of the administrators had different delivery mechanisms, and all had different incentive structures for their programs. Three of the four administrators (LADWP, STF, and

SDREO) delivered incentives directly to building owners. SMUD chose to deliver incentives to contractors (roofers) rather than to building owners.

We interviewed 28 people about the Cool Roofs program. Twenty-two interviews were with decision-makers from different types of organizations and locations that were involved with the program. The remaining 6 interviews were conducted with CEC staff and administrator groups.

Although only one administrator (SMUD) targeted roofers, almost all the owners we talked with said it was their roofer who notified them about the Cool Roofs program. Some participants also mentioned marketing materials from the administrators, ENERGY STAR, manufacturers, and their peers as sources of information about Cool Roofs. The owner of a small office shared how he learned about the program and decided to participate:

I was talking to the roofer that put the roof on and he mentioned something about it.... I started checking around and found one of the companies that supplied the products for the manufacturer's rep. And they were the ones that told me about the rebate program. (#24)

Our interviews suggest that roofing contractors were an important delivery mechanism, particularly for those groups of owners that do not normally receive or pay attention to energy efficiency program information.

Compared with the other CEC programs we looked at, the Cool Roofs program had a relatively large pool of participants from fairly small businesses.¹¹ Even so, the minimum 5,000 square foot roof area that most administrators maintained was a problematic threshold for some would-be participants. A property manager for a small regional real estate firm, for instance, decided to replace the roofing on his 10,577 square foot strip mall with Cool Roof materials, but after he performed his repairs he found he did not qualify for the program. Due to this experience, he voiced the following complaint:

The rules and regulations they have attached to the use of those [Cool Roof] products are very ineffective. It favors large landlords that have large roofs and a lot of square footage.... A lot of small businesses cannot comply with the number of square feet that they're asking for. Or let's suppose you have a lot of footage, but you're going to do it piecemeal as roofs need to be repaired. It doesn't favor that. It discourages it. I've got all these sheets here to turn in when the roofing is done but I can't do it because ... it's not going to fit within the parameters of the program.... I didn't get any funding at all, even though I put some [reflective roofing] on. I don't even want to submit it [the paperwork]. It isn't worth my time to submit it and not qualify. (#95)

Despite some difficulties with qualifications, in general participants in the program were very positive. Usually, they had intended to replace or recoat their roof anyway, Receiving an incentive to do it was an additional benefit.

The program seemed to be most popular with owners of roofs with many perforations that were in need of an upgrade. For these applications, many roofers were recommending their customers use a roof coating. Billed as a better product that became even cheaper with the rebate, these customers selected the cool roof coating and discovered afterwards that it was supposed to deliver energy savings. Organizations installing cool roofs were often doing it as part of routine

¹¹ The Innovative Program, for instance, had a 20kW threshold for participation that tended to limit participation from smaller businesses.

roof replacement. When asked if they were installing cool roofs the manager of engineering for a large real estate firm had the following reply:

Yes, just as a routine replacement. We do a lot of roof maintenance so we are not going out to any of our existing roofs and coating them with reflective coating to qualify for Cool Roofs. It doesn't make any sense to do that. (#26)

Although some Cool Roofs participants were interested in energy savings and anxious to do more to make their facilities energy-efficient, many participants told us that the roof coating was basically a business-as-usual choice and that they had taken no other conservation actions during the summer of 2001.

The level of awareness about the Cool Roofs program from participants in other CEC programs was mixed. We found some participants in other energy programs who were aware of the Cool Roofs program and intended to consider it in the future when they need a new roof. A capital facilities administrator who participated in the Public Loans Program had this to say about Cool Roofs:

We have not done much with it. There have been a couple of articles that have been brought to my attention. And I have suggested to our facility manager that when we program new roofing, let's think about this. So we are spreading the idea, but have not done a project. But it looks relatively inexpensive and a smart thing to do. (#8)

On the other hand, some participants in other energy programs had very little awareness that the CEC was sponsoring a Cool Roofs program. An energy manager for a national sporting goods chain (#121) who participated in the Innovative Program described combing the internet for additional programs that might work for her facilities, yet she had no idea prior to our interview that a program to support Cool Roofs existed. At the end of the interview, she requested (and was given) contact information for a Cool Roofs administrator in her area.

Cool roof products are relatively new to the market and it may take some time for them to become more widely accepted. The manager of engineering for a large commercial real estate firm noted cool roof products (single-ply and EPDM (rubber) roofs) are going against tradition, but the market is changing. He told us:

Yes, actually the market here in California is a built-up asphalt roof and that's what a lot of companies try to sell because that is what they have been doing for years and years. So now when you bring in a company that does a cool roof, you are really battling against old school and new school. The new roofs hadn't been around that long and were not proven but now that these roofs have been proven, it's a lot better. The warranties are longer and the roofs are easier to put on. (#26)

His firm is currently using an EPDM-type roofing with a 20-year guarantee that qualifies for cool roofs on all of its buildings.

Participants we spoke with offered the following recommendations for improving the program.

- Applicants often do not make the distinction between square footage of business versus square footage of roof, which in some cases led to miscommunication. This needs to be clarified.

- Make it easier for participants to identify the roofing products that qualify for the program. Searching through product lists can be cumbersome.
- Increase the speed of inspections so that participants can more quickly find out whether they qualify for the program and how much of an incentive they are eligible for.
- Continue to develop relationships with the roofing industry and roofing contractors as important allies and a principle delivery mechanism.
- Promote the overall quality and performance of roofing materials that qualify for cool roofs.

Ultimately, roofing is not seen as an energy issue. People do not replace their roofs to save energy—they replace (or repair) them to provide structural protection. Programs intended to encourage early repair or replacement are going to have significant difficulties if the main goal of such programs is energy savings. Program incentives are not sufficient to cause an organization to install a cool roof product unless they are already planning to replace or extend the life of their existing roof. In a replacement or repair situation, the roofer is an important ally. Programs are more likely to be successful when the roofer is actively engaged in the process. Likewise, if new roofing products are going to become more common, they must demonstrate improved roofing performance relative to more traditional roofing products.

4.1.3 Innovative Peak Load Program

The Innovative Peak Load program was designed to solicit peak electricity demand reduction proposals that were not eligible for funding under existing or planned programs. It also provided incentives to third parties to install measures that reduce peak electricity load. The program is based on the belief that there are many good peak demand reduction ideas, but they do not reach market implementation because of insufficient start-up funds or the idea is not eligible for any current funding source.

The Innovative Peak Load program consisted of three parts, depending on the scale of the proposed project: small grants, large grants, and aggregated contracts. The small grants part of the Innovative program was administered by Xenergy and considered projects that would result in a peak demand reduction of between 20 kW and 400 kW. Projects that promised demand reductions of over 400 kW were managed by the CEC and separated into two categories: large grants and aggregated contracts. Large grantees were responsible for using the funds to improve their own practices and properties. Aggregated contract grants were made to third parties who promised to work with others to achieve the proposal goals.

Although some commercial organizations did develop their own proposals and contract directly with the CEC, third-party delivery agents were particularly important in this program. Consultants played a vital role in proposing many projects in each of the three program parts. As noted above, the aggregated contract portion of the Innovative program was designed specifically to encourage proposals from single entities to work across businesses. In at least one case, a new company was formed to respond to this opportunity.

We interviewed 28 people about the Innovative Peak Load program. Nineteen of these interviews were with decision-makers from a range of organization types in different geographic areas. The remaining nine of these were “key informant” interviews with CEC staff, contract aggregators, and administrator groups. Note that our interviews focused on organizations

implementing energy efficiency measures in buildings and do not represent the full range of participants in the Innovative Peak Load program.¹²

The Innovative program supported the implementation of a range of technologies. In some cases, the funded technologies were truly unusual. In other cases, the technologies were conventional, but the delivery methods were innovative (or nontraditional), utilizing aggregators or contracting directly with organizations with large demand reduction potential. In still other cases, as we discuss below, both the technologies and the delivery methods were conventional.

While the flexibility of the Innovative program offered organizations the opportunity to do something out of the ordinary, this flexibility came at an administrative cost. Whereas other CEC programs established rule-of-thumb measures to determine whether or not an applicant qualified for program funds, applicants to the Innovative program shouldered the burden of proof for their ideas. Organizations applying for Innovative funds had to design their own efficiency goals, methods, and implementation plans. For organizations with a high capacity for making energy efficiency decisions, this facet of the Innovative program posed no obstacle.

Organizations with lower levels of institutional knowledge about energy management, however, had difficulty developing implementation plans and dealing with the administrative requirements. The energy manager for a national drugstore chain, for example, insisted that the CEC required far too much information from his organization:

[The program manager] has got everything except my blood type. And she keeps coming back and asking for more. How much more do you want? ... My people out there in California...the only thing they're going to do in there is go out and change the lamp. That's what I hired them to do. Not to take an audit and say this is how much it's going to save, how many hours the store is operating, based on the temperature outside and whether or not it's cloudy or full sun. It's not their job. And yet they're being asked or told that we need that information. They can't provide it. They're not capable. And I can't. I'm 2000 miles away! (#158)

This concern about “proof of savings” resulted in several organizations using the Innovative program to fund the implementation of fairly conventional technologies, such as lighting retrofits, where the energy-savings calculations were fairly straightforward. In these cases, the Innovative program supported measures that were (a) more conventional than innovative and (b) associated with overall efficiency improvements more than peak demand. For example, a manager for a commercial real estate firm told us that their Innovative-funded lighting upgrades were identical to their business-as-usual practice, except it allowed them to accelerate the pace:

We've been doing this actually for some time. A lot of times we'd do a tenant improvement for a tenant. And we'd change out the old 4 tube magnetic ballast fixtures for two tube electronic ballasts. However, because of the CEC money, we were able to do it all at one time. Otherwise we would have upgraded just as the space turned over. (#110)

Another company—a major computer manufacturer in Silicon Valley—submitted two proposals to the CEC: the first was for a lighting upgrade, the second for a LAN-based controls strategy. The lighting upgrade was funded, the controls strategy was not. In the view of the company's energy manager, the more mundane project was funded, and the more innovative one was not. He urged the CEC to make the Innovative program more supportive of innovations:

¹² Additional details about respondent selection can be found in Appendix B.

It's unfortunate that a project like our controls project was not approved for the higher level of funding.... Right now, in my opinion, the state of California, if you've got a viable project, now is *not* the time to be weeding out which ones to fund. It's time to fund and move on. I believe that the CEC should offer more programs like this. If they want to get aggressive, put more money on the table. (#140)

Those aggregators administering programs that offered conventional measures found that they were competing with utility programs that were also offering these measures. This was particularly true of lighting measures. In some cases, aggregators felt they did not have the flexibility to compete with these programs because of limits on the incentives they could offer. Also, because the program was limited to measures that reduced electricity demand, aggregators could not offer other types of measures that might make their programs more attractive.

Because participants in the Innovative program had to deliver at least a 20 kW load reduction, participation in this program was oriented toward large organizations and aggregators. Although it was possible for small organizations to participate in the Innovative program through an aggregator (e.g., clients purchasing shade screens through Novatia), it was difficult for a “mom & pop” shop to directly benefit from this program. Several small consulting firms (#113, #111, and #131) used the program to price their services more competitively to large clients. Even though these firms benefited from the program, all expressed concern about the difficulty of formulating proposals and the longevity of funding. One consultant told us that for his one-man lighting design shop, each CEC proposal was a huge risk:

It takes a lot of time to put the thing together, and then I have to sell it to my client. If the CEC rejects my proposal, then I don't get the job. And then I'm out of time and money. (#131)

The Innovative program was a new program that dealt with a wide range of demand reduction and efficiency measures. Participants we spoke with offered the following recommendations for improving the program:

- Streamline the proposal process.
- Streamline the administrative process.
- Provide more funding for truly “innovative” projects and reconfigure the application process to credit new ideas, even if they are difficult to quantify.
- Provide some means of participation for smaller businesses.
- Make the funding stream more stable and secure.

The Innovative program seems to have largely met its performance goals in a cost-effective manner during the energy crisis and the experience of delivering this program can be used in the future development of third party energy efficiency programs.

4.2 Policy Implications

Given the combination of rising costs, public pressure, and the presence of incentive programs, it is small wonder that many organizations took some kind of conservation response. The nature and substance of an organization's responses, however, are not easily mapped to the size of its buildings, the purpose of its work, or the class of its customers. For example, in the retail sector the Demand Responsive program was equally attractive to a big box retailer, a high end

department store, and a grocery chain; three different types of retail establishments, yet they all chose a similar energy solution. Nor are energy responses predicted by the choices of similar sorts of organizations. For example, of the five full-line department stores we interviewed, only two participated in a CEC program. Of the two participating stores, one joined the Innovative Program and the other selected a Demand Responsive strategy. Of the three department stores that did not participate in a CEC program, one applied for a Demand Responsive grant and was rejected; one hired Enron; and the third worked alone. Here we have a case of several similar retail establishments, each choosing a different solution. What factors can explain why similar stores do different things, and different stores do the same thing?

The information we have collected about the experiences of organizations during the energy crisis provides a unique opportunity to examine organizational conservation actions and the interactions that might impact organizational decision-making. The interactions of interest to this study—informational messages, program interventions, price or rate changes, and external triggering events (e.g., blackouts) all occurred during 2001. In this section we consider the policy implications of our work. Based on our interviews, we offer a model of organizational conservation action that we believe can serve as a guide for developing a policy response. Then we apply this model to suggest some policy ideas for future program development.

4.2.1 Models of Organizational Conservation Action

Our research findings provide a basis for proposing a new model of organizational conservation action. This model expands on conventional views of conservation action and helps to explain what we observed in our research. We believe this model provides a starting point for improving our understanding of organizational energy behavior and developing well-targeted policy interventions to encourage energy efficiency and conservation by organizations.

4.2.1.1 Conventional Views: Inputs and Outputs

4.2.1.1.1 Prices

A *simple view* of organizational action would suggest that the energy crisis (price increases, blackouts) led, rather unproblematically, to self-interested conservation action.

crisis → conservation action

4.2.1.1.2 Market Barriers

A more sophisticated view of economic decision-making suggests that the market for energy conservation practices is not wholly efficient. This *market barriers* view suggests that a number of problems may stand in the way of a decision-maker purchasing a more efficient technology. For example, the decision-maker may lack information about the technologies available, or the first cost of the efficient technology may be too high, etc. Classic demand-side management programs are put in place to overcome these market barriers.

crisis → market barrier → DSM program → conservation action

4.2.1.1.3 Non-economic Responses

California's energy policy effort included a prominent promotional and advertising campaign—Flex Your Power. Components of this campaign fit the pattern of overcoming the market barrier of lack of information that was mentioned above. Other components fit a second theory of consumption change: the *promotion/media view*. This view suggests that the media campaign made people aware of actions they could take and encouraged them to take those actions out of a sense of duty, patriotism, pride, etc. Once informed, the public responded by altering their consumption practices as recommended.

crisis → media campaign → conservation action

4.2.1.2 Inside the Organization

These views all have elements of truth, but they tend to overlook the internal dynamics of organizations themselves and treat organizations as a homogeneous group. This does not help to explain why organizations did (and didn't) take action and how future efforts to encourage energy efficiency and demand reduction might best be tailored and targeted. An *elaborated view* holds that, whatever the source, *concern* is a necessary pre-condition for action (and concern was not universal last summer). Also, regardless of the level of concern, the *capacity* of organizations to act also varies and is a crucial pre-condition for conservation action.

crisis → programs/media → concern + capacity → conservation action

4.2.1.2.1 Concern

Concern can be created by the effect of the energy crisis on an organization. As described in section 3, this concern might result from energy price effects, threats of blackouts, or the desire to contribute to averting the negative consequences of the crisis. The energy crisis created a unique set of circumstances that created a level of concern about energy within many organizations that did not exist before. But not all organizations were affected by the energy crisis and some developed little concern.

4.2.1.2.2 Capacity

We use the term 'capacity' to reflect both knowledge capacity and the ability within an organization to act on that knowledge. There is a branch of organizational theory that examines how organizations use and handle information, particularly as far as innovation is concerned. Much of this literature deals with information flows: how information gets into an organization, how it is transferred within the organization, and where it goes once it is adopted or rejected.

From an energy efficiency standpoint, it is most important to think about who "has" or "can get" energy consumption information, and whether or not they can use this information wisely to formulate a plan for change. In many organizations, energy knowledge capacity resides in a single person or a small group of people. These people have different levels of skill and experience with energy issues. They have different professional contacts and contexts in which they work, all of which affect their ability to access, process, and act on energy information.¹³ Sometimes the knowledge is formal (e.g., the energy manager has a degree in energy management), sometimes the knowledge is experiential (e.g., the energy manager learned how to

¹³ For instance, two energy managers for different large retail chains started their conversations with us by asking who we'd already talked to. They then rattled off the first names of all the other energy managers in similar positions at different companies.

manage energy while on the job), and sometimes the knowledge is tacit (e.g., the energy manager just does what seems to work). And sometimes, of course, the knowledge just isn't there (e.g., either there is no energy manager or the person managing the energy doesn't have appropriate training or interest). This makes it difficult for an organization to respond to energy crises in an informed way.

Likewise, where energy knowledge exists within an organization is important. The structure of the organization, the degree of control it exerts over its energy decisions, the flexibility it has in making changes, and the importance it places on energy or environmental decisions all play a role on its ability to take action.

4.2.1.2.3 Conditions

A more **complete view** also recognizes that, despite concern and capacity, the *real-world conditions* facing the organization (the nature of its buildings, its production processes and machinery, its capitalization structure, supplier dependencies, and a host of other real-world conditions and constraints) are also crucial determinates of conservation choice. Conditions are responsible for defining real-world *opportunities* for action by an organization.

crisis → programs/media → concern + capacity + conditions → conservation action

“Conditions” can be subdivided into “technical” and “network” components. Technical components deal with those things that influence what can physically be done to the building. They include the diversity of an organization's building stock, its age, its condition, whether it is owned or leased, whether it is a stand-alone store or a mall space, and, of course, what kinds of technologies and practices currently exist in the building. Networks deal with those components that support the physical infrastructure of the organization. This can include the capitalization of the organization, procurement systems, product and supplier availability, and building services. These conditions provide opportunities for certain actions, while limiting the ability for other actions.

These are the beginnings of a model that locates the firm and its technology in a larger context. It offers a framework for a possible (future) *structural/causal account* of how and when conservation action is taken and might be expected (e.g., among populations of retail firms, agribusiness, hotels, prisons, high-rise office buildings, etc.). It should be noted that this model is an alternative to the **market barriers view**. It recognizes the internal dynamics of organizations and the conditions they face. It suggests that programs should focus on organizational concern, conditions, and capacity rather than market barriers.

4.2.2 Policy Responses

In Table 4.1, we present a matrix of possible combinations of concern, conditions, and capacity factors. For simplicity's sake, the matrix treats the three factors described above as binary variables. Although the reality is much more complex, this reductionist view allows us to develop a heuristic for use in exploring how to tailor and target policy interventions to the circumstances of particular subgroups of organizations. This matrix can help us consider what actions might help maintain or raise concern, develop capability, and increase capacity.

Our intention is to develop a systematic way of thinking about how real-world circumstances differ in their effects on organizations. Examples in the following subsections show how this matrix relates to the CEC programs we studied. Our hope is that this matrix will enable policymakers to think about how programmatic issues may be resolved in new ways.

Table 4.1. A Heuristic for Tailoring Conservation Interventions

Concern Concern about energy	Conditions Opportunities for conservation	Capacity Ability to act on opportunities	Policy approach to increasing energy efficiency (EE)	Speculation about whether price increases might encourage (+) or discourage (-) conservation action
Yes	Yes	Yes	Recognize/Encourage EE	+
Yes	No	Yes	Recognize past EE, create future opportunities	+
Yes	Yes	No	Technical assistance, incentives, peer support, education	+
Yes	No	No	Technical assistance, peer support, education, create future opportunities	+/-
No	Yes	Yes	Incentives, non-energy benefits, recognize past EE	+/-
No	No	Yes	Support continuous improvement, identify non-energy benefits, recognize past EE	-
No	Yes	No	Technology assistance, incentives, peer support	-
No	No	No	Mandatory efficiency standards	-

4.2.2.1 Raising or Maintaining Organizational Concern

There generally was a raised level of concern for energy by organizations as a result of the energy crisis. This was due to rising costs and public perceptions. We learned that all the attention given to the energy crisis (by the media, peer organizations, etc.) did have an influence on organizational concern for energy. However, we found factors that could erode the level of concern that occurred in 2001. For example:

- The media attention devoted to the energy crisis has largely disappeared. What little media attention that exists is largely critical of the major players involved in the crisis. This is producing very mixed messages about the crisis and the need to continue to respond.
- Other crises or issues will take over the attention and resources of organizations and push energy to a lower priority. Current issues include a much higher level of attention being paid to security and the decline in the overall economy.

- Attention to other issues also causes energy programs to fall to a lower priority of California government. Some of the programs that promoted energy reduction have disappeared, and the current budget crisis makes justification of continued high budget levels for these programs difficult.

The policy question is how to maintain a level of concern for energy that is sufficient to maintain or encourage behaviors that lead to reduced energy demand/consumption.

One important element of concern for some organizations is higher energy prices and their impacts on budgets (particularly for public sector organizations). Retail electricity prices have increased significantly and are not likely to go down anytime soon. This will continue to put pressure on organization budgets and profits and justify the investment in consumption reduction. Policy mechanisms that take advantage of pricing mechanisms (like tiered rates) are one effective way to maintain concern and reward good energy efficiency practices. However, it is important for energy price mechanisms to be clear and consistent. Lots of changes in energy prices and various price adjustments create uncertainty and confusion that can make it difficult for organizations to identify price impacts and make decisions to act on those impacts. Likewise, if utility bills are complicated and difficult to understand, it is less likely they will be useful tools for organizations in their efforts to manage costs. So policies might focus on ensuring energy rates reward good energy management practice, that organizations understand the energy rate structures, and that utility bills clearly inform organizations about their energy use.

The energy crisis engaged a variety of institutions and peer organizations in delivering energy-related services and messages to their networks and clients. The CEC has also established information channels with participants in their programs. These networks and information channels are important for maintaining energy concern among various energy user groups and they should be retained, strengthened, and used.

The energy crisis created concern for many organizations, but it is not possible or useful to attempt to maintain a crisis mentality. New crises have already appeared (security, economy) and have displaced energy as a key concern for organizations. It is important to broaden the energy message and look for ways to leverage the energy crisis to encourage organizational attention to energy as good management practice. The energy crisis demonstrated to some organizations there can be risks to ignoring energy. Those risks have not gone away. Paying attention to energy is a good risk reduction strategy. Good energy practices can also be used to respond to other organization concerns such as environmental issues or maintaining a healthy and productive workplace for employees. Energy efficiency can provide many benefits besides energy cost reductions that may turn out to be more important to organizations in situations when there is not an energy crisis. Peers and peer organizations may be a good resource for reinforcing energy as a ‘best management’ practice.

Concern for energy occurs at different levels in organizations. It is important to communicate the energy message at a variety of levels to the organization including management, staff, and energy professionals. Decisions to act usually involve staff at different levels. In some cases, organization customers were an important factor in raising organizational energy concern.

However, not all organizations will be equally concerned about energy. Even in the energy crisis there were organizations that showed little concern—smaller organizations with minimal energy costs, organizations served by municipal utilities whose rates did not go up, organizations with third party energy contracts, and organizations that could pass their costs on to others (some

retail and commercial real estate). We found that public sector organizations and organizations in the public eye (large retail) had a little higher level of concern and may be good targets for future activity.

4.2.2.2 Increasing Organizational Capacity

The energy crisis was a short-term event that emphasized a rapid response. This favored organizations with existing capacity to act. We found that organizations tended to rely on internal expertise or knowledge to make decisions or they utilized existing external networks/relationships (peer organizations, contractors, utility representatives).

We observed several things that occurred during the energy crisis that can contribute to maintaining the capacity of organizations to take conservation and energy efficiency actions.

- Many local government organizations developed energy plans and procedures during the 2001 energy crisis or dusted off existing policies. These plans provide mechanisms within organizations that will continue to support and justify energy actions.
- The 2001 energy crisis raised consciousness in organizations that energy conservation, efficiency, and demand reduction are good practices that justify the investment of resources. Any concrete savings achieved will reinforce this view.
- Peer organizations and networks played a role in helping public organizations develop the capacity to respond. In some cases these groups even acted as aggregators. In the long-term this may be a good way to continue to support activities to build organizational capacity.

The events of the energy crisis were short-term in nature and the policies and programs that were implemented were intended to reduce electrical demand in the near term. While programs provided information and limited assistance, they did not aim to build organizational energy capacity in the long-term. In order to raise the level of organizational energy efficiency in the long-term, policy approaches need to consider ways to build organizational energy capacity by encouraging and supporting best energy management practices in organizations¹⁴. The events of the energy crisis suggest that peer networks and relationships are important ways to help make this happen. Partnering with these organizations to develop information, education, and training activities is something that should be pursued.

Our research showed that organizations believed they were getting benefits from their energy efforts, but they had little hard evidence of this. Capacity building activities should put more emphasis on showing the results of good energy management practices. This could be tied to activities that reward and recognize organizations that have good energy management practices. Recognition is an important way for organizations to justify and reinforce their energy actions.

Energy managers and other organization staff that deal with energy often work within organizations with little support or acknowledgement. In some situations the energy crisis raised the prestige of organizational actors who had energy expertise. They were able to use this

¹⁴ Examining organization “best energy management practices” was not within the scope of this research, but there are a variety of resources that outline energy management practices that have been used successfully by organizations.

prestige to take conservation actions. To the degree that organizational structures changed to accommodate the input of these actors, the result will be lasting, but the prestige factor alone seems likely to quickly fade. Publicly recognizing energy managers who played a role in California's summer response is one way to reinforce the value of these persons to their organizations. Developing external supports or networks that provide peer support, training, and professional development also improve the value and effectiveness of these individuals and ultimately increase the energy capacity of their organizations.

One of the key aspects of an effective energy management program is tracking energy use and cost. The utility bill is the data source for doing this. Designing utility bills so that they support organizational energy management efforts is one potential mechanism for building organizational energy capacity. For larger organizations with multiple meters and accounts, energy accounting services are a valuable energy management tool.

While developing internal organizational capacity to act is one way to encourage energy conservation action, making it easier for organizations to take advantage of the opportunities available to them is another. This includes streamlining program application processes to match an organization's capacity to respond. For example, asking organizations to bear the cost of application preparation can be a barrier to action. This is particularly true for smaller organizations. Many of these organizations are not likely ever to develop much capability to act. The "express" efficiency programs that provided turnkey services to small clients may be a way to address this population.

When we speak of organizational energy capacity it is important to recognize that how organizations deal with energy varies and it is not always easy to characterize. In some cases our conventional ideas do not hold. For example, we often try to distinguish between large and small firms, but firm size can be a somewhat amorphous concept. We talked to people in large organizations that operate small stores. We also talked to people in small firms that operate large buildings. Consider the ways it is possible to characterize a small clothing store that is part of a chain (e.g., The Gap). From an HVAC perspective, it is a small retail space. From an economic perspective, it is a large business.

Likewise it is important to understand where decisions are made. In some large organizations, energy decisions are made at the local level (like a small firm), while in other cases, central management personnel make energy consumption decisions for all organization locations without any input or control from the local level. Central decision-makers may not account for important local factors that one might expect to favor certain types of actions. For instance, one facility manager at a distribution center for a national toy store noted that most energy-related decisions for his company were made in the corporate headquarters in New Jersey. "They're in New Jersey," he stressed, "not California. They don't know what it's like here."(#134)

How energy management is handled in an organization can also vary considerably. For instance, is "energy management" a job title within the organization, or is it something that the facility manager does in his or her spare time? At one Bay Area military/industrial manufacturing company, for instance, none of the seven employees we talked to were "in charge" of energy use, but each of them knew that the way they performed their duties affected the energy consumption of their facility. From an organizational standpoint, these employees were going above and beyond their job descriptions to think about energy (#1-7). In comparison, we interviewed an energy manager at a national sporting goods company who was the first person to hold this

position within the company (#121). Within her company, she had to play her role and prove its utility at the same time. In other companies, energy management teams had been established a decade or so ago, had already proved their value, and were an integral part of the corporate structure (#79, #141).

These organization characteristics have a great deal of influence on an organization's capacity to act and they are critical for understanding the appropriate policy action to encourage conservation action.

4.2.2.3 Creating Conditions for Organizational Action

Organizations were constrained in the actions they could take in response to the energy crisis by the conditions that existed within their organizations. In the short-term it is difficult to remove these constraints. The policy question is how to create conditions that provide long-term opportunities for organizations to take positive energy actions. One way to do this is to work within the existing planning frames that organizations use and encourage organizations to make plans that create opportunities for improved energy use. Program stability is a key component of organizations' ability to plan and respond. Large organizations in particular need lead time to make decisions. Fluctuations in program incentives, goals, requirements, etc., make that difficult. This suggests the importance of having programs that have some certainty of continuing and that have consistent and clear expectations and benefits.

New technology and practices create new opportunities. Existing systems become obsolete and need to be replaced. Supporting the development of new technology and encouraging its adoption in the market place is important for creating conditions that provide opportunities for organizations to increase their energy efficiency.

The energy crisis made some organizations more aware of the need to be able to curtail and better manage their energy load. Yet some organizations found that their existing equipment did not allow them to do this. This creates the opportunity to develop conditions and capability in organizations to better control and manage their energy load. In particular this involves technologies like control systems, uninterruptible power supplies, and distributed generation. It does not have to involve new equipment, but might involve more effective use of existing systems. It also does not have to be complicated—it could be as simple as having multiple switching capabilities for lighting. But ultimately, organizations need the technical infrastructure that allows them to implement changes in their energy use quickly. Building codes could even require that buildings have the capability to curtail a certain portion of their load for certain periods.

Supporting an energy efficient market is important, particularly now in the case of widespread trial adoption. Market delivery mechanisms will play a key role in maintaining the gains of technology change. There will need to be replacement supplies available, technicians qualified to work on the efficient equipment, etc. (for example, if replacement CFLs are not available, consumers will return to using incandescent bulbs). Energy Star buildings provide a mechanism for making energy efficiency an important market commodity. The marketplace can then provide conditions that make it easier for organizations to take action.

5 Conclusion

Ultimately, our research has revealed that the commercial sector cannot be effectively considered as a monolithic entity. Common energy policy assumptions about consumption practices and business behaviors do a poor job of describing the variety and complexity of organizational responses that we expected and observed. We have presented a model of organizational action that begins to explain how, why, and when organizations make choices about energy consumption options. Further development and refinement of this inter-organizational dynamic will contribute to more effective energy policy formulation and implementation.

Our model suggests that organizational energy behavior can be better understood by considering energy-related organizational concern, conditions, and capacity. The energy crisis was a short-term event that created a new context for energy action, but we found that it really did not change the underlying framework for organizational energy behavior. The energy crisis impacted concern, conditions, and capacity in different ways for different organizations and led to a varying energy response or change in energy behavior. Existing conditions and capacity shaped the organization response. For desired energy behavior to be long-term there must be long-term change in concern, conditions, or capacity. The policy question then becomes how to support long-term change in these areas. And a real challenge lies in moving from a short-term crisis approach to a long-term policy approach.

In order to move to a long-term approach, we see programs and policies that:

- Develop relationships with organizations and aim to better understand organizations. Using existing peer networks and service delivery systems is an important mechanism for accomplishing this.
- Create more certainty in the marketplace. Programs and policies need to exist for periods of time before they are incorporated into organizational processes. Provide opportunities for organizations to reduce uncertainty.
- Reward, encourage, and support good long-term energy management practices in organizations. Support efforts that result in changes in organization structure that lead to improved energy management practices. Demonstrate how good energy practices can provide many benefits that respond to organization concerns and needs.
- Support organizational efforts to be better (more responsive) consumers of energy through targeted outreach, recognition, networking, and education efforts.

Further research on energy-related organizational decision-making is also clearly warranted. We have presented a preliminary model of organizational action that begins to explain how, why, and when organizations make choices about energy consumption options. We believe that further development and refinement of this understanding of intra- and inter-organizational dynamics can contribute to more effective energy policy formulation and implementation. However, the research reported here was conducted under a crisis time frame and was not intended to be comprehensive or definitive. Also, it was one of a number of studies and evaluations undertaken by government agencies, consulting firms, and non-government organizations—all under crisis conditions, and with a resulting variety of strengths and weaknesses. As a consequence, a number of research questions about organizational conservation responsiveness remain to be addressed. One is whether there is evidence of long-term change in the energy behavior of organizations following from the actions taken last

summer to reduce energy consumption. Another is how the variety of research and evaluation work on organizations and their actions in 2001 have produced both complimentary and contradictory findings. A third is how the behaviors observed in the retail and office sectors might compare with those in other organizational sectors (e.g., extraction, manufacturing, distribution, etc.).

6 References

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Appendix A: Interview Protocol

1. Tell me a little about the organization you work for.

Prompt for function, size, regional distribution.

2. Please briefly describe your roles and responsibilities at your organization.

Prompt for how this relates to energy use in their organization.

3. How has the current energy situation affected your business?

Prompt for impacts on their business (such as blackouts, loss of business, operating expenses/energy costs, etc.).

Prompt for experienced or expected changes. Is the situation getting better or worse?

4. What actions has your organization taken in response to the energy situation?

Prompt for when actions were taken.

Prompt for the nature of these actions.

Prompt for how this compares with or is this different than the past.

5. How did you find out about each alternative?

Prompt for sources of information or knowledge that contributed to the decision.

6. Who was involved in the choice of each action?

Prompt for how the choice was made. The process and people involved.

Prompt for whether parties external to the organization were involved in the decision.

7. Why was each action selected?

Prompt for business reasons behind the choice.

Explore the influences of the four key interactions: programs, prices, information, external events.

8. How did you learn about the program?

Prompt for what motivated them to participate in this program.

9. How important has the program been in your overall energy actions?

Prompt for how the program influenced other energy actions in their organization.

10. Would you recommend participating in the program to others?

Prompt for what they liked about the program. What could be improved?

11. Have you heard of any programs to encourage energy consumption reduction?

Prompt for what they heard. When?

12. Have you considered participating in any of them?

Ask for things about the programs that prompted their interest.

13. Why did you choose not to do so?

Explore what might encourage them to participate in the future.

14. What were the results of energy conservation actions?

Prompt for expectations. Are they being met?

Ask about important benefits from these actions. Have they helped your organization in any way?

Prompt for any problems or negative impacts from these actions.

Ask about how results are being measured/perceived.

15. Given your experiences this summer and the current energy situation in California, how do plan to respond in the future? Why?

For actions involving changes in behavior, ask if they will continue.

For one-time actions such as a technology purchase, ask if they would do this again (or make this purchase again) in the future.

Prompt for actions they would like to take, or if they have future plans for new actions.

Prompt if there are things or events that might cause them to change what they are doing or plan to do.

Appendix B: CEC Program Descriptions

The level of participation in any voluntary program is influenced by how the program is managed and delivered, as well as the underlying theory that supports it. The CEC offered many different programs in 2001 to encourage Californians to seek energy-efficient solutions. As a basis for later analysis, we describe below the basic structure of each of these programs and summarize the types of participants interviewed.

B.1 Public Agency Loan and Grants Program

To identify public sector organizations to include in our research, we relied largely on participants in the public agency loan and grants program. The State of California has had a public agency loan program for almost 20 years. During this period \$66 million in loans have been provided to schools, state agencies, local governments, hospitals, and non-profits.

In response to the energy situation in California, a new program was developed in 2001 to encourage higher levels of energy efficiency and demand reduction in public facilities. The new program is a continuation of the previous loan program and uses the infrastructure developed for that program. The big difference between the new program and previous versions is the low 3 percent interest rate. Previously, this rate was set at the state investment pool rate, which was usually around 5 to 6 percent. A new feature is an early project completion incentive that provides a grant for a portion of the loan amount if the project is completed by a certain date. This amount ranges from 10 percent if the project was completed by September 1, 2001 to 3 percent if it was completed by May 1, 2002.

The new loan program began in May 2001. The legislature allocated \$48 million for the program. In 2 months the CEC received enough applications to use all of their funding and by September the allocated funds had largely been encumbered.

B.1.1 Management

The California Energy Commission administers the public agency loan and grants program. Applicants need to provide a complete description of their project and conduct an analysis demonstrating that the savings generated by the project will pay back the loan (some assistance is available to pay for this analysis). CEC staff reviews the applications to make sure the savings and costs are reasonable and that the project will be successful. They develop the contracts for successful applicants and then monitor the project and administer the loans.

B.1.2 Delivery Agents

The CEC markets their loan and grant program to facility, public works, and general services staff at public institutions. They use mailing lists, attend meetings, and work through energy service companies to get the word out.

The institutions are responsible for implementing their energy projects. It is common for an energy services company to be involved with the implementation of these projects including completion of the initial technical analysis and design of the project, assistance with developing project financing, construction of the project, and follow up monitoring. Some institutions rely largely on their own staff to develop and implement projects.

B.1.3 Completed Interviews

The sample for public sector program participants was drawn from the initial list of 43 applicants for the public agency loan and grants program. Our selection focused on institutions that were implementing building projects, since that was the focus of our study. Most government organizations have a mix of facility types. We classified counties and cities in the office category, since a significant portion of their floor space houses administrative functions. Schools, hospitals, and colleges were classified in the other category.

We conducted 14 interviews with participants in the public agency loan and grants program (Table B.1). We also conducted 10 additional interviews with public sector institutions. Several of these applied to CEC programs, but in the end did not participate. The others participated in other utility or CEC programs (Cool Roofs and Innovative).

Table B.1. Interviews of Public Sector Decision-makers by Building Type and Region

Public Sector Interviews	Bay Area	Central Valley	LA Basin	San Diego	Totals
Large Office	6	2	2	1	11
Small Office					0
Large Retail					0
Small Retail					0
Other	1	1	0	1	3
Totals	7	3	2	2	14

B.2 Cool Roofs

The Cool Roofs program promoted the use of reflective roofing materials as a means of reducing the peak load related to air-conditioning. This program was available to non-residential and multi-family buildings that were mechanically cooled in summer and located in 14 out of California's 16 climate zones. In addition to the CEC-sponsored statewide Cool Roofs program, there were several local programs promoting similar technologies also in effect (e.g., San Jose/Santa Clara County Cool Roofs Incentive Program).

B.2.1 Management

The CEC worked with the Local Government Commission (LGC) to coordinate the Cool Roofs Program with the help of a set of four program administrators.

The four groups that administered the Cool Roofs program were: The Sacramento Tree Foundation (STF), the Los Angeles Department of Water and Power (LADWP), the Sacramento Municipal Utility District (SMUD), and the San Diego Regional Energy Office (SDREO). Each of these groups worked within a different geographic area. The administrative boundaries of these areas were clear for both the municipal utility districts (SMUD and LADWP), and more amorphous for the regional non-profits (SDREO and STF). This meant that a building owner in some southern areas of the state might possibly apply to either STF or to SDREO for assistance. Each of these administrators also had different requirements, some had different delivery mechanisms, and all had different incentive structures for their programs.

B.2.2 Delivery Agents

Three of the four administrators (LADWP, STF, and SDREO) delivered incentives directly to building owners. SMUD chose to deliver incentives to contractors (roofers) rather than to building owners. Because the bulk of the administrators selected building owners as the key decision-makers for Cool Roofs, we focused our interviews on building owners rather than on roofers.¹⁵

¹⁵ An exploration of the difference between these two different delivery structures is beyond the scope of this report, but it is a topic we have considered for further research.

Unlike the Innovative Peak Load Program, consultants or third party aggregators did not play a large role in the delivery of the Cool Roofs program. In fact, one of the Innovative Peak Load aggregated contracts was awarded to a membership organization to promote cool roofs amongst its members.

B.2.3 Completed Interviews

The core areas of the administrators fit fairly well with our project goal of reaching respondents in four distinct geographic areas. Using data supplied by the administrators, we worked with each group to select appropriate respondents for interviews within each administrative territory. Each administrator was asked to assist in selecting respondents who (a) fit the size and organizational distribution in our research plan, (b) were not over-burdened by other requests for information, and (c) had a range of responses to the technologies promoted by the program. We were interested in talking to participants who, in the administrators' views, had both positive and negative experiences with energy efficiency.

We interviewed 29 people about the Cool Roofs program. Six of these interviews were conducted with CEC staff and administrator groups. The remaining 23 interviews were with decision-makers from different types of organizations and different locations. The geographic and organizational distribution of the interview sample is shown in Table B.2 below.

Table B.2. Interviews of Cool Roof Decision-makers by Building Type and Region

Cool Roof Interviews	Bay Area	Central Valley	LA Basin	San Diego	Statewide/ Nationwide	Totals
Large Office	1	2	2	2		7
Small Office	1	4	1			6
Large Retail	3	1	1	1	2	8
Small Retail		1	1			2
Other						0
Totals	5	8	5	3	2	23

B.3 Innovative Peak Load

The Innovative Peak Load program was designed to be the “catch-all” category for energy efficiency proposals that did not fit other programs. Whereas the Cool Roofs program promoted a single technical strategy for reducing peak load, the Innovative program provided support for a wide variety of techniques and behaviors ranging from shading devices to lighting upgrades to operational changes. Whereas the Public Loans program worked with a particular customer type (public sector agencies), the Innovative program had no such limitations.

B.3.1 Management

The Innovative Peak Load program was organized around the scale of the proposed project and the relationship of the applicant to the proposed work. This organizational scheme resulted in three different pieces to the program: small grants, large grants, and aggregated contracts.

The small grants part of the Innovative program was administered by Xenergy. Although almost any kind of proposal would be considered, applicants had to prove that their efforts would result in a peak demand reduction of between 20 kW and 400 kW. Projects that promised demand reductions of over 400 kW were managed by the CEC and separated into two categories: large grants, and aggregated contracts. Large grantees were responsible for using the funds to improve their own practices and properties. Aggregated contract grants were made to third parties who promised to work with others to achieve the proposal goals.

B.3.2 Delivery Agents

Although some commercial organizations did develop their own proposals and contract directly with the CEC, third party delivery agents were particularly important in this program. Consultants played a vital role in proposing many projects in each of the three program parts. As noted above, the aggregated contract portion of the Innovative program was designed specifically to encourage proposals from single entities to work across businesses. In at least one case a new company was formed to respond to this opportunity.

B.3.3 Completed Interviews

In contrast to the Cool Roofs program, which matched our project filter of building type and geographic region, it was difficult to select appropriate respondents in the Innovative Program to match some of our analytical categories. In particular, the 20 kW threshold for participation in the Innovative Program meant that many small businesses could not qualify unless they were aggregated in some way with other businesses. Small retail building types were represented in the Innovative participant pool, for instance, but only as part of national chains rather than stand-alone “mom and pop” shops. Although the applications required detailed information about the nature of the applicant organization, data on building area was not collected so could not be used definitively as a selection basis. Geographic distribution was also difficult to achieve, as many of the participants were part of statewide and national chains. Recognizing that our objectives and the organization of the Innovative program did not fit well, we worked with CEC managers and program administrators to develop a pool of participants that used the average size of the buildings in a portfolio to distinguish between “large” and “small”.¹⁶ These have been kept in a separate category in the table below, to emphasize the organizational difference between a fleet of small stores and the more typical small businesses that we interviewed in other parts of our project.

We interviewed 28 people about the Innovative Peak Load program. Nine of the interviews were “key informant” interviews with CEC staff, contract aggregators, and administrator groups. The remaining 19 interviews were with decision-makers from a range of organization types in different geographic areas. The geographic and organizational distribution of the interview sample is shown in Table B.3 below.

¹⁶ We would also like to note that the administrators selected additional interview candidates that represented a better cross-section of their participant pool than the respondents we were primarily interested in. Had our task been to evaluate the participant pools of each program, their selections would have provided an excellent basis for this endeavor. Because our evaluation task was constructed across programs, however, we felt it was important to adhere as much as possible to the overall framework which was developed with the combined goal in mind.

Table B.3. Interviews of Innovative Decision-makers by Building Type and Region

Innovative Interviews	Bay Area	Central Valley	LA Basin	San Diego	Statewide/ Nationwide	Totals
Large Office	2		1	5		8
Small Office						0
Large Retail		1	2		3	6
Small Retail		1			2	3
Other		2				2
Totals	2	4	3	5	5	19

B.4 Non-participants

The term non-participant is somewhat amorphous in our use here. In our initial interpretation, we meant people who had not received incentive payments to alter their energy consumption; however, that definition would not cover the Flex Your Power campaign members. They didn't receive payment, but they did have a social or public relations incentive to change their consumption. We then refined our definition to those people who had taken actions for which they received no inducement. With the initiation of the 20/20 rebate program, however, almost anyone could have received an economic incentive to change their energy consumption.

Even defining non-participants as “those people who did not participate in any CEC program” was not as straightforward as it might seem. Some respondents had tried to participate in a CEC program but dropped out (or were rejected) at some stage of the process. In these cases, the point at which they ended their participation had an effect on their attitude toward the CEC specifically and incentive programs generally. The list of reasons people were not considered full CEC participants included: payment of the incentive had not been received, the respondent did not meet the particular program's qualification criteria, or the respondent took an action which would have qualified for an incentive before the program was put in place. Among the people who didn't meet the CEC's qualification criteria, some learned of their disqualification before applying, while some learned only after going through the application process. In general, the greater the amount of effort taken before realizing that an incentive wouldn't be received, the greater the respondent's negative attitude toward the CEC and toward incentive programs.

Ultimately, the best description of our non-participant pool is “those people who did not complete participation in a CEC-funded economic incentive program.” This pool includes respondents who received CPUC-funded rebates; respondents who tried but failed to complete CEC-funded programs; respondents who took solely “voluntary” actions; i.e., did not apply for economic incentives or publicly commit to changes in consumption practices; and respondents who made no changes in their consumption practices at all. They are therefore not a control group in the standard sense of the term, but rather a group of people who had not experienced full and complete participation in a CEC program. A table of these respondents by business type and location is provided in Table B.4 below.

Table B.4. Interviews of Non-participants by Building Type and Region

Non-Participant Interviews	Bay Area	Central Valley	LA Basin	San Diego	Statewide/ Nationwide	Totals
Large Office		1	1			2
Small Office	1	2	1	4		8
Large Retail		1			4	5
Small Retail		1	1			2
Other	2	4	2	1		9
Totals	3	9	5	5	4	26